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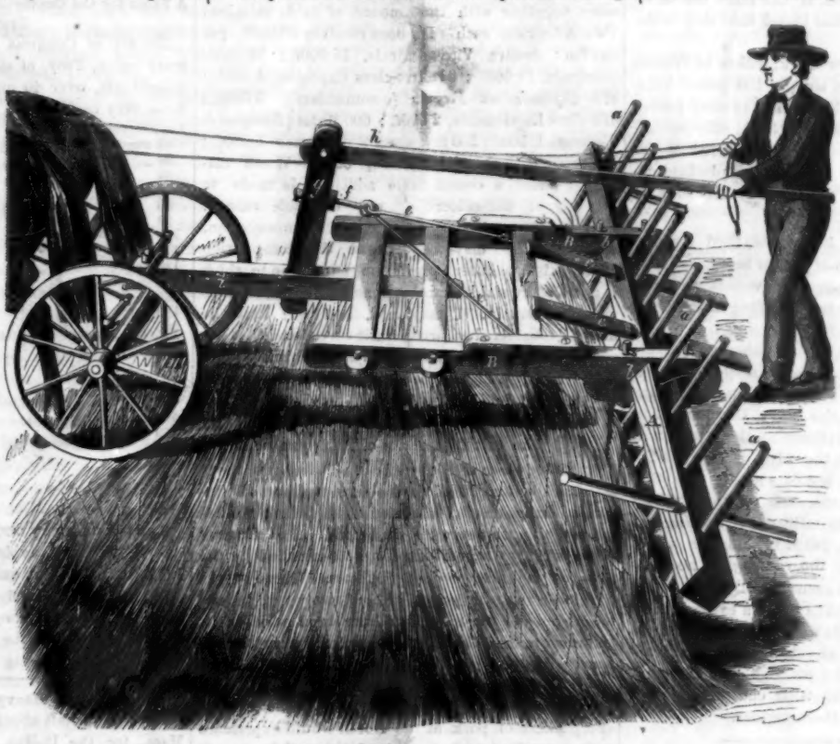
Improved Patent Horse Rake.

When the haying season is at its hight, and the mower goes forth with his scythe to reap with slow but sturdy strokes the bearded stalks that rear themselves before him, a lively picture is presented to the beholder. After the mowers come the rakers who lay the grass in swathes so that it may be properly cured by the sun and turned into hay. In a great measure the poetry of the harvest field is destroyed by the introduction of machinery, but in an equal ratio, the labor is facilitated by new and improved tools that far outdo, in perfection and quantity of work performed, the old-time hand method. A newly-patented machine for this purpose—hay-raking—is here illustrated, and its several parts and the operation of them will be readily understood by referring to the letters. It consists of a long piece of timber, A, studded at regular intervals with round wooden bars or teeth, *a*; this is the rake proper. At equal distances from the center of the timber are the journals, *b*, which revolve in bearings made for them in the frame, B. At right angle with the teeth and fastened to the same timber, two stout catches, *c*, project, the round pieces in line with them (on either end) being for the purpose of turning the rake when the load is thrown off. In connection with the catches, *c*, is the transverse sliding bar, *d*, upon bearing frame, B, before-mentioned. The sliding bar is connected by braces, *e*, running from each end of it, and made fast to an eye-bolt, *f*, projecting from the upright *g*. These details, with the long handle, *h*, constitute the main features of the rake.



BROWN'S PATENT HORSE RAKE.

The operation of it is as follows:—The forward end, *i*, is attached to a pair of wheels or a wagon, and drawn over the new-mown field by horse or cattle power. As the team progresses the swath is caught in the teeth of the rake, and lays up against them in a long furrow. When this is sufficient in quantity the driver, who either rides or walks as may best suit his pleasure, withdraws the sliding bar, *d*, from under the catches *c*; the teeth then roll over the load and leave it upon the ground, and the bar is thrown back again by the lever or handle, *h*; the rake is then ready for work again. The jaws of the upright piece, *g*, are beveled on each side from their center, inwardly and outwardly; this allows the handle to be moved over on either side of a right line with the center of the frame, so that as the driver walks at the right or the left of his rake, he can have the sliding bar at all times under control. The rake proper an, by means of the bearings in the frame, B, be adily detached and transported to the field in a wagon. The bar has only so much play back and forth as is necessary to allow the catches to revolve past it. The attachments and design of this apparatus are very simple and strong and the whole invention seems admirably calculated to the work for which it was designed. It can be operated from either end, before or behind, and the principles on which it is constructed make it entirely free from the rattling and clatter which is sometimes a bad feature of these tools.

The patent for this invention was procured through the Scientific American Patent Agency. Further information respecting it can be obtained by addressing the patentee, N. T. Brown, Ononwa, at Louisa Co., Iowa.

The Broom Business.

Perhaps there is not a branch of American manutures (says the Philadelphia *Ledger*) that has within a few years increased so rapidly in extent, attended at the same time with a large advance in prices, as the manufacture of brooms. The acquisition of California, and the settlement there of a large population depending upon importation for a supply of necessary articles, and the increased population of cities and villages, have of course given an impetus to the trade of this city in brooms, as in almost everything else. But the demand for export to European and Australian markets has been the leading cause of the large increase in this particular business.

The dealers in New York city are principally supplied from Schenectady, N. Y., although the towns of Headley and Hatfield, in Massachusetts, furnish a considerable number yearly. It may afford our readers some idea of the extent of the business to state that one firm in New York sell annually about forty thousand dozen brooms manufactured in Schenectady, and ten thousand dozen from towns in Massachusetts. Most of the brooms manufactured in Massachusetts find a market in Boston. There are half-a-dozen houses in New York city dealing largely in brooms; they are principally in Fulton street. The ordinary brooms of which we speak, have sold recently as high as $17 a hundred—this is the Schenectady manufacture. In the Massachusetts manufacture, the corn is fastened upon the handle with a small wire, instead of stout twine, and the article consequently is not considered so valuable. A few years since, brooms that now bring the above price could be bought at from eight to twelve dollars per hundred. Lately, brooms have been sold by weight, at from eight to eleven cents per lb. The average weight is a pound and a half.

The broom corn used in this manufacture is raised principally in the valleys of the Mohawk and the Connecticut. The soil at the bottoms along those rivers possesses certain characteristics highly favorable to the growth of this agricultural product.—Although the labor attending its cultivation is great, it is considered a valuable crop—being more hardy than maize, and less liable to injury from frosts. It was a good deal cultivated in the Genesee Valley a few years ago, and is now to some extent; but the product goes to supply western and local markets. The crop is becoming one of decided importance, and it will, no doubt, attract the attention of farmers more generally than it has done; while to its manufacture a great amount of mechanical ingenuity and capital will be turned.

Fresh Blown Flowers in Winter.

Choose some of the most perfect buds of the flowers you would preserve, such as are latest in blowing and ready to open, cut them off with a pair of scissors, leaving to each, if possible, a piece of the stem about three inches long; cover the end of the stem immediately with sealing wax, and when the buds are a little shrunk and wrinkled, wrap each of them up separately in a piece of paper, perfectly clean and dry, and lock them up in a dry box or drawer; and they will keep without corrupting. In winter, or at any other time, when you would have the flowers blow, take the buds at night and cut off the end of the stem sealed with wax, and put the buds into water wherein a little nitre or salt has been diffused, and the next day you will have the pleasure of seeing the buds open and expand themselves, and the flowers display their most lively colors and breathe their agreeable odors.

Propositions to the Navy Department.

The following propositions were received at the Navy Department during the week ending Nov. 1, 1862. [Published in conformity with a resolution of Congress approved July 12, 1862:]

Leopold Ritcher, Springfield, Ill., offers to furnish his maps of the State of Illinois at $8 each.

J. X. Browne, New York, offers to furnish Furman's steam engine trap to two Government ferry boats at the lowest cash rates to individual purchasers.

Slipper & Co., New York, offer to furnish from England, 500 tuns or less, of iron armor plates, 8 feet long, 34 to 36 inches wide, and 1 inch or less, thick, at 6⅞ cents per pound, if allowed to enter them free of duty, delivered at the Boston or New York navy yard.

D. W. Kolbe, Philadelphia, offers to furnish artificial limbs at $50 for each limb amputated above knee joint; or $35 if amputated below knee joint.

By the Bureau of Ordnance.—E. G. Allen and A. N. Clark, Boston, offer to make and deliver within 11 months from date of contract 10,000 Brand's breech-loading rifle musket complete at $30 each; also, 10,000 carbines of the same patent for $22 each.

"Architectural Iron Works," New York, offer to deliver at the Brooklyn navy yard 2,000 or more 15-inch shells at 4¼ cents per pound, to be made of No. 2 selected Thomas iron, if the same can be secured, or, if not, of any other brand that may be desired, at the same cost.

James McCullough, New York, offers to furnish musket bullets (regulation size) in 100 pound kegs, at 10½ cents per pound, delivered at the navy yards.

J. B. Brown & Co., Peekskill, N. Y., offer to furnish shot and shell of all sizes, delivered at the Brooklyn navy yard, at 3½ cents per pound—internal revenue tax added—will deliver 50 to 100 tuns by Nov. 25th.

The Navy Department have advertised for proposals for the construction of one or more iron-clad sea-going steamers; the vessel or vessels to be of about 7,800 tuns, complete, including machinery, masts and spars of iron, wire rigging, iron boats, with anchors, cables, sails and all other equipments necessary for an efficient cruising ship-of-war, excepting only the ordnance stores. The general plans are now on exhibition at the Navy Department in Washington. By the advertisement these proposals will only be received up to the 24th of Nov. 1862—less than one month from the date of the advertisement. At a rough estimate, each of these vessels will cost not less than two millions of dollars, and over two years will be required to complete one of them. The iron works of the country are now employed night and day, and even now fall short of the work required of them. The opinion exists that to build such enormous vessels their speed must in some manner be sacrificed; for, as yet, not one of our iron-clads has come up to the contract rate of speed, owing, in some measure, to their enormous weight and the want of power in their engines.

The American Soldier.

The Paris *Pays* publishes an extract of a letter written by Gen. Cluseret, a French officer now in the service of the United States, in which he says of the soldiers under his command:—

"After two months of campaign and sufferings such as I never endured, even in the Crimean war, where we never were in want of food, nor exhausted by long marches, I can speak to you knowingly of the American soldier. During all that time we have been marching night and day, oftentimes without bread, with half of our men shoeless exposed to a chilly rain, without shelter, tent or village. We have thus walked between 150 and 200 miles. But that which, in my estimation, makes the American soldier the first in the world—the equal of the French soldier—is that I never heard him utter a complaint or grumble. I never was compelled to inflict a punishment upon him. When I ordered a straggler to fall in, he used to show me his naked feet and hurry on as much as he could. I have but a word to express my opinion of the American soldier: he is an admirable soldier. He adds to the qualities of the French a patience and a resignation which I did not think it possible for a soldier to acquire."

The French Navy.

The following is an enumeration of the iron-cased ships which the Minister of Marine has at his command, and which might proceed to sea on the receipt of a dispatch from Paris:—Four frigates, each of 900 horse power; carrying from 34 to 40 guns, with a crew of 250 men. The iron-cased frigates *Magenta* and *Solferino* might be prepared for sea within three months; they are each of 1,000 horse power; they carry 52 guns, and a crew of 600 men. The *Prince Imperial*, a frigate of equal force, is not so far advanced. It is not expected that she will be ready for sea before the end of the year. There are likewise on the stocks in the various ports of France 10 iron-cased frigates of 1,000 horse power, each carrying 38 guns and a crew of 570 men, and likewise six iron-cased corvettes of 150 horse power, carrying 14 guns and 250 men. In case of necessity, all these might be formed into line-of-battle, within eight months. There is likewise the *Plongeur*, whose special quality is to sink an enemy's ship, and which is armed for that purpose with a wrought iron spur. And, finally, there are sixty gunboats covered with iron masks. These boats, which draw very little water, are intended to cover a descent on an enemy's coast and to protect the French seaboard.

A Paris letter says "According to the Budget of 1862, which has just been laid before the Corps Legislatif, the following is the strength of the staff of the French navy, together with the amount of their salaries: Two Admirals, each of whom receives 30,000f. per annum; twelve Vice-admirals, 15,000f.; 24 rear-Admirals, 10,000f.; 65 first-class Captains, 4,500f.; 270 *Capitaines de Fregates* (commanders), 3,500f.; 375 First Lieutenants, 2,500f.; 600 Mates (*Enseignes de Vaisseau*), 1, 500f.; 200 first-class Midshipmen, 1,000f.; 100 second-class Midshipmen, 600f. When employed afloat a considerable addition is made to the pay of flag-officers by way of table money. But, looking at the amount of remuneration, some surprise may be felt at the competition which exists to enter a profession, admission to which is guarded by strict examinations, and whose rewards are so uncertain. I may add, however, that the navy is considered an aristocratic corps, and that the officers—never being taken from before the mast—enjoy as a body a higher social standing than those of the sister service."

The Salt Discoveries of Michigan.

In consequence of the supply of salt from Southern salt fields being cut off by the rebellion, and the increased duties on the imported article, the price has reached a figure never known before. The range of prices must, to a great extent, be controlled by the quantity manufactured at Saginaw. These works have been in operation only about two years, yet the productions of these regions have been widely felt, and must materially affect the market. But for the timely discovery of these vast salt fields, the deficiency of this indispensable article would be as keenly felt in the North as it is at the South. The growers and packers of pork at the North would experience serious results from a scarcity of this article, were it not for the extensive salt manufactories of Saginaw. This fact has rendered Saginaw a place of considerable importance, and people are turning their attention to the manufacture of this important article of commerce. The extent of these fields is almost unlimited, and the supply inexhaustible. They are between forty and fifty miles in length, stretching from the bay westward to where the Chippewa river pours into the Tittebewassee, and even ten miles beyond, and in breadth extending for more than thirty miles, the whole country thus bounded forming an enormous basin that is full and constantly filling with 85 @ 92 per cent. brine. Bore anywhere in this immense field to a depth of 800 feet, and this brine is found in inexhaustible supply. There is no longer either any question as to the quality of the brine; it contains impurities, but it is believed no more and none different from those found in Kanawha or Onondaga brines.

With this vast extent of territory, continuing to yield such immense quantities of brine, there can be little doubt that the North will eventually be bountifully supplied from this region alone. In consequence of the importance of this comparatively new country, as a great lumber and salt manufacturing region, it is being rapidly opened up by the enterprise of capitalists. Saginaw, which in 1834 had not a white inhabitant, has now a population of 3,000 and is a thriving commercial town. Salt docks now alternate with lumber yards for twenty-five miles on the river banks.

For the manufacture of fine salt, there are nineteen blocks that toil day and night—Sundays not excepted—an average of sixty kettles each. About twenty more blocks are nearly completed, which will soon be at work—all will be run to their utmost capacity through the winter. At present the best blocks turn out an average of forty barrels per day. During the year Saginaw has produced about six hundred thousand barrels.

The importance and extent of the salt interest in Michigan has occasioned improvements in the art of manufacturing it, and the old kettles and furnaces are gradually giving way to the new process of evaporating by steam in large vats, which produces a better quality of salt, and at a reduced cost. The increased demand for this indispensable article of commerce, and the limited supply at present to meet it, must naturally render the Saginaw Valley of great importance in a commercial point of view, and it is but reasonable to suppose that the facilities for its manufacture will be correspondingly increased.—*Detroit Free Press.*

A Table for the Conversion of Avoirdupois Ounces into Troy Ounces.

The act of Congress imposing a tax of 3 cents on every ounce, Troy, of silver plate used by families or individuals, over 40 ounces, renders the following table very useful:—

Avoirdupois.	Troy ounces.	Tax.
44 ounces.	40	$0 00
50 "	45·6	0 17
60 "	54·7	0 44
70 "	63·8	0 71
80 "	72·9	0 99
90 "	82·0	1 26
100 "	91·1	1 53
110 "	100·3	1 81
120 "	109·4	2 08
140 "	127·6	2 63
160 "	145·8	3 17
180 "	164·1	3 72
200 "	182.3	4 27
250 "	227·9	5 64
300 "	273·4	7 00
350 "	319·0	8 37
400 "	364·6	9 74
450 "	410·1	11 10
500 "	455·7	12 47
550 "	501·3	13 84
600 "	546·9	15 21
700 "	628·0	17 94
800 "	729·1	20 67
900 "	820·3	23 41
1000 "	911·5	26 14

The tax on every ounce, Troy, of gold plate, is 50 cents. A pound, avoirdupois, contains 16 ounces of 7,000 grains. A pound Troy contains 12 ounces of 5,760 grains. The weight of an ounce Troy is, therefore, greater than an ounce avoirdupois. A pound of the latter is equal to 14 ozs. 11 dwt. 15½ grs. Oh, for a law of uniformity in weights and measures!

Heavy Iron Work.

The crank-shaft about being forged at Bridgewater, Mass., for the Italian frigate, to weigh over 40,000 pounds, though exceeding in length previous forging of this character, is not the heaviest ever successfully made. The center shaft of the steamships *Illinois* and *Golden Gate*, forged in New York city in 1851, each exceeded it, one of those weighing in the rough a little over 54,000 pounds.

Crank-shafts are forged much heavier than they are finally finished. They are found to be strongest and cheapest when hammered in a solid mass or lump, not crooked, and the shaping done by cutting away the iron cold. The cranks of most of our iron-clads and other double-engined propellers are produced in this way. The American forges make the heaviest work and form the strongest material in the world.—*Exchange.*

Cost of Recruiting.—The cost of raising soldiers under different State authorities varies very much. In Michigan, 1,000 men cost $21,000; in Iowa, 1,000 men cost $22,500; in New York, 1,000 men cost $27,385; in Illinois, 1,000 men cost $42,605; in Wisconsin, 1,000 men cost nearly $100,000.

In describing Perry & Boley's pump in last week's paper, it was erroneously stated that the patent was obtained through this office.

MANUFACTURE OF ELASTIC TOYS.

In every age children have been furnished and pleased with toys. Among the native races of America, Africa and China, and the inhabitants of the most civilized nations, toys are found in every family. Germany, in a general sense, until within a very few years, was the toy manufactory of Europe and America. The heads of dolls were most frequently made of porcelain or plaster-of-paris, and the other parts of such toys were made up of wood and cloth. Although some of them exhibited considerable skill and taste on the part of the makers, yet they were most commonly crude wooden things, easily broken, by simply allowing them to fall upon the floor. Among the varied products of that wonderful substance—vulcanized india-rubber—a new American art has been developed in its application to the manufacture of elastic toys. Tuns of them are made annually in the Wicapee factory, situated on the Fishkill, near Matteawan, in Dutchess county, N. Y. They are as superior to the old German toys in every respect as can well be imagined. Extensive and special machinery and apparatus are required in their production, and a more varied and artistic taste is displayed in this art perhaps than any other connected with india-rubber manufactures.

After being thoroughly cleansed, the india-rubber to be used for toys is kneaded in the usual way, between large polished iron rollers heated by steam. It is thus reduced to a plastic condition, and is then rolled into sheets and mixed with a certain proportion of sulphur. It is afterward molded by pressure in metallic dies of the form and size of the toys required. These articles are formed in sections, which are cemented together and thus made hollow. A small quantity of water is placed in each, and they are secured in their dies, almost like molder's flasks, and placed thus in an oven where they are subjected to heat for some hours. This is the vulcanizing process, as by the action of the heat the sulphur unites with the india-rubber, forming a new compound, possessing the elasticity of the natural rubber, but entirely devoid of its stickjness, and at the same time it is capable of withstanding a high degree of temperature without becoming soft. The water plays an important part in the interior of the toy. It is converted into steam in the oven, and this not only prevents the material from being injured by an excess of heat, but by its expansive action it presses upon all parts of the india-rubber inside, and thus maintains the article in its perfect hollow form in the dies. This explains how such articles as hollow balls can be vulcanized and retain their form. After being vulcanized, the toys are ornamented by painting, &c. A great deal of taste is frequently displayed in those finishing operations, and a large number of girls are engaged in that department. Many of the dolls appear to be clothed in velvet and fine woolen cloth. The drapery, however, is all formed of india-rubber; the velvet and cloth imitations being produced by dusting silk and woolen flocks upon the respective parts, which are prepared with a peculiar varnish to make the flocks adhere. Thus if a female doll is to be dressed with a black velvet spencer, the entire body is prepared with the varnish, and then dusted over with black flocks. Such dolls are really pretty and far surpass the most elaborately dressed of the old fashioned plaster-of-paris style. As a separate die is used for every toy of a different size and pattern, a very large number is required. Some of these display high artistic skill, and involve much expense in the preparation. An endless variety of such toys are now manufactured, from babies' rattles, parlor balls "the musical monkey," "the sleeping Dutchman tickled with a straw by the mischievous boy," to "the old woman that lived in a shoe."

A Successful Inventor.—Mr. Charles Coale, of New Brighton, Pa., obtained a patent on a new Japan varnish on the first of April, 1862, through the Scientific American Patent Agency. He now writes to us that since that time he has sold more than $6,000 worth of his varnish, with his business daily on the increase. This is certainly doing very well for so short a period, and shows what inventors can do even in these hard times. The inventor's testimonials from those who have used the varnish are highly flattering.

VALUABLE RECEIPTS.

Indelible Ink.—The basis of indelible ink is nitrate of silver. Such ink is chiefly used for marking linen for the purpose of withstanding the bleaching action of washing and exposure to the sun. Jules Guiller's indelible ink is made of nitrate of silver by weight, 5 parts, distilled water 12, powdered gum arabic 5, carbonate of soda 7, ammonia 10. These ingredients are mixed together and heated in a flask until the mixture acquires a dark tint. This ink may be thickened with sufficient gum mucilage to print indelible marks with type. Redwood's indelible ink is prepared as follows:—Dissolve one ounce of nitrate of silver and one and a half of crystallized carbonate of soda in separate portions of distilled water, then mix them together when they will form a precipitate; this is collected in a filter and washed with distilled water. It is now placed in a porcelain mortar and 8 scruples of tartaric acid added and the whole triturated until effervescence ceases. Next add a quantity of ammonia to dissolve the tartrate of silver and mix with it 4 fluid drachms of archil, 4 of white sugar and 12 of powdered gum arabic; then pour in as much distilled water as will make 6 ounces of the mixture. This indelible ink differs from the common kind in the substitution of the tartrate for the nitrate of silver. Another more simple indelible ink is made as follows:—Take 6 drachms of nitrate of silver and dissolve in 3 ounces of distilled water and as much ammonia is added as will liquify a precipitate of the silver, which occurs at first. A little neutralized sulphate of indigo is now added and 4 drachms of gum arabic mucilage, when it is ready. These inks should be kept in red glass bottles, or where they will be excluded from the action of light. The cloth after being marked with such ink should be exposed to light, and also slight heat before the fire, or the heat of a flat iron. If cloth is first prepared with a solution of the chloride of tin, then washed and dried, and afterward written upon with a solution of terchloride of gold, an indelible black is also formed. An ammonical solution of a salt of gold, mixed with a portion of the indelible ink made with the tartrate of silver, produces a superior indelible ink, but it is too expensive for common use. A purple red indelible ink is made with a solution of 1 drachm of bichloride of platinum in 2 ounces of distilled water. The linen must be prepared to receive it by first being moistened on the part to be marked with a solution of 3 drachms of carbonate of soda and 3 drachms of gum arabic in an ounce and a half of water; and then dried.

Curious Petrifaction.

The Panama *Bulletin* tells this curious story:—It will be recollected that about four years ago, Mrs. Kearney, wife of the late Mr. James Kearney, died in this city. Her husband, at that time being a merchant in Aspinwall, had a zinc coffin made, in which she was placed, and also a quantity of alcohol, the whole then imbedded in charcoal, in a still larger coffin, for the purpose of preserving her, as it was her husband's intention to have her sent to England; but shortly afterward he took sick himself and died, and also his child. The body then remained in the cemetery undisturbed, until a short time ago, instructions were received from her relations in England, to have the body exhumed and interred in the cathedral. On opening the coffin the body was found to be petrified and perfectly marble-like, but, strange to say, as quick as the air got to the body it changed to a light copper color.

Whisky and Newspapers.—A glass of whisky is manufactured from perhaps a dozen grains of corn, the value of which is too small to be estimated. A pint of this mixture sells for one shilling, and if, of a good brand, is considered well worth the money. It is drank in a minute or two—it fires the brain, sharpens the appetite, deranges and weakens the physical system. On the same sideboard upon which this delicious beverage is served lies a newspaper. It is covered with half a million of types—it brings intelligence from the four quarters of the globe. The newspaper costs less than the glass of grog—the juice of a few grains of corn; but it is no less strange than true that there is a large portion of the community who think corn juice cheap and the newspaper dear!

Philadelphia Water Works—Turbine Wheels.

At the meeting of the City Councils of Philadelphia, held on the 16th ult., the Chief Engineer of the Water Works submitted a report in reference to the turbine wheels at Fairmount. It states that the new turbine wheels furnished by Emile Geyelin have been run at intervals since the month of June last, and that although some of the machinery does not yet work perfectly, the defects have not been greater than usual to new machinery of such magnitude. The gate of one turbine will not close sufficiently to entirely prevent the waste of water through the wheel. The gearing for raising the gates does not yet work effectually, owing to the fact that the guides and working surfaces of the gate have become so much rusted by exposure as to increase the friction beyond the strength of the gearing. This will be remodled, either by increasing the strength of the gearing or by counterbalancing the gates. The main gearing works accurately and smoothly, but it has not been in operation a sufficient length of time to test whether the amount of surface presented by the teeth of the several wheels is adequate to the work to be performed.

In reference to the percentage duty the Chief Engineer says: "I am prepared to say, from the limited experience and tests of the pumping capacity of the work, I estimate the duty at somewhat over 70 per cent. This is not as great as the duty given by Mr. Geyelin's model, nor quite as much as that guaranteed in the contract; but I attribute this principally to the injudicious arrangement and limited size of the ascending mains and to the imperfections in the machinery before referred to. I am confident that, with a direct ascending main to the reservoir of an area equalizing and in proportion to the area of pumps, and after the machinery is fully completed and operated for a reasonable length of time, to make it perfectly free and smooth in all its parts, the wheels will give the full duty guaranteed in the contract."

Wanted—A Domestic Cider-Mill.

However great an improvement the portable cider-mill has proved itself, its usefulness is evidently susceptible of very great extension. Nearly every one is fond of cider, but from the difficulty of procuring a good article almost everybody has to do without it. Now, if the portable cider-mill could be modified into a simple machine for family use, so that the cook could turn out a gallon of cider for dinner as easily as she makes a gallon of coffee for breakfast, a great boon would be conferred on every owner of a single tree. A wide field is here open for some ingenious man to enter and reap an abundant harvest. The suggestion is thrown out for consideration.

In almost every hardware store in the Union you may find a vast variety of simple contrivances from which snug fortunes have been made. The domestic cider-mill could be sold by hundreds, even in the cities, for here we own no apple-trees, yet we can supply ourselves in market at all seasons of the year. It might also be adapted to the manufacture of all kinds of wines, such as grape, currant, gooseberries, elderberries, blackberries, tomato and rhubarb.—*Country Gentleman.*

West Point Graduates and Loyalty to the Union.

We have received a pamphlet by Mr. E. C. Marshall, published by D. Van Nostrand of this city, containing statistics of those graduates of West Point who have remained loyal, and those who have joined the secession army. The number of graduates who resigned, were dismissed, dropped and cashiered, between November, 1860, and the close of 1861, was 203, nineteen of whom were of northern birth. There are also nine graduates of northern birth who resigned prior to November, 1860, and are now in the secession ranks. Of southern graduates, 178 have resigned, but 133 have also remained loyal. In 1860 there were 747 graduates of West Point in the army, and to this number, 73 of the June class of 1861 are added, making 820, of which no less than 617 have remained loyal.

The Albany Gas Company have refused to sell their coke, and determined to give it to the poor of the city. This handsome and beneficent conduct seems to disprove the old adage that "Corporations have no souls."

WHAT MAY BE SEEN AT THE ATLANTIC DOCKS.

The tourist who has sailed down the waters of New York Bay must have noticed, as his glance swept around the horizon, a long row of granite buildings just opposite Governor's Island, upon the Brooklyn side of the harbor. These are the Atlantic Docks, and were built some twenty years since by a company formed for that purpose. The shape of the docks is that of a quadrangle, inclosing a basin of harbor which covers an area of forty acres; this has been dredged out, for the most part, from what was formerly nothing but mud flats; indeed, some portions of this basin were entirely bare. The channel has been made twelve feet deeper than it was originally, and an average depth of water secured throughout. The docks extend for a distance, southwardly, of nearly 3,000 feet, or a little over half a mile from the Hamilton Avenue Ferry; eastwardly the sides of the square are unequal, but will average together about 800 feet; while the rear block has a water-face of 2,000 feet. The aggregate amount of water front is 13,700 feet; of store front 4,280 feet—the discrepancy being accounted for by the fact that some parts of the property are not yet built upon; and all of the warehouses together cover fifteen acres of ground. The stores themselves are of great size, as they must of necessity be, to accommodate all the wealth which, at different times of the year, is sheltered beneath their roofs. They are fire-proof, or so much so, that if a fire originated in any one of them, it would be confined to that one alone. As there is but little else than bare stone walls and the usual floors, the flames would soon exhaust themselves for want of material.

The Atlantic Docks were erected for the purpose of having secure and safe repositories where vessels could break bulk or discharge their cargoes while awaiting a market. All sorts of products, from every part of the world, lie here at times; and we noticed, during our walk over them, tea, coffee, sugar, molasses, pork, salt, hides, and, last, though not by any means the least, grain. To form a proper idea of the wealth of the country in this one branch of its industry alone, one must go to the Atlantic Docks and see the incipient loaves and barrels of flour pouring from spouts, rising up in dusty clouds from the canal boats, or else hoarsely rushing down like the voice of the distant sea into the dark hold of some foreign vessel. The seeker-after-information must go, as we have gone, over the entire length of the wharves and see the quantities of grain which are piled upon the ground-floors and basements of the warehouses—must watch the busy elevators, whose tireless muscles, day in and day out, delve down among the corn and wheat, whirl it away aloft, cleanse it, sift it, and finally return it again ready for shipment. The mind stands aghast, almost, at the amount of food which is here garnered. When we reflect upon the possible and, indeed, certain consequences of its being withheld from the world at large, we are glad that the laws of commerce require its exchange for other staples. Wars, rebellions, famines, these are only the great evils which would result from hoarding it up in our barns and stores; lesser ones would follow in their train. Let us try and form some idea of the grain crop this year, as displayed by the quantity now shipping there. Think of a bushel of grain; it seems a small affair—one that a stout boy can readily throw upon his shoulder; then multiply this amount by a thousand, and tens of thousands, and ten thousand again, and you will have but a small part of all the great crop of cereals which, at this moment, lies upon the wharves or afloat in the basin, waiting to be scattered over Europe. When we estimate food at this rate we lose all ideas of space and weight. Suppose, however, that an acre of land produces twenty bushels of corn, which is a very moderate yield; it would then require 90,000 acres of land to fill one of the new brick warehouses lately erected by the company; and the same corn, filled into canal boats, would extend a distance of five miles. Five miles of bread in one store alone! Or, to put it in still another shape, the store in question is 460 feet long, by 180 feet wide; that would be almost five full city lots wide by nearly two lots deep; conceive of this area filled with corn or wheat as high as a man's head, and we have some approximate impression of quantity as reckoned in bushels of grain. These values, of course, are not mathematically correct, but are sufficiently so to illustrate the enormous amount of breadstuffs now in bulk at the Atlantic Basin. One may walk down the whole water front, which is, in round numbers, about two miles and three-fifths long, and in nearly every basement see the yellow corn open to the free air and sunlight, drying and curing, so that it will be fit to transport. Or we may discover in others the sullen wheat and rye, dead and cheerless to look at in comparison with the shining corn, reaching away up to the ceilings, eddying about timbers and posts, or else slowly filtering out through holes in the floors, where the capacious maw of some elevator swallows it in great masses, dust and all, and disgorges it again in bags free from dirt or rubbish.

It is impossible to view all this display of the cereal wealth of the country, without feelings of the most lively patriotism and even awe. When we think that out of the fruitful soil of those new and, as yet, we were about to say, almost unknown prairies, such results can be obtained, what shall the yield be when house elbows house, and cities, towns and villages whiten every rood of the plains, and even climb the slopes of the Rocky Mountains themselves?—for all free things naturally seek the mountains. What shall be the gain when new and improved machinery thrusts in its hand and cuts the glittering stalks that nod to the wind?—what the vast benefit to mankind when the nation, knowing the art of war no more, turns the weapons of the battle-field into the tools of the farmer, and wrests from the plains, that only await the seed to answer with the overflowing harvest, an abundant return for his toil? To this enumeration of the resources of our western hemisphere we are led by the contemplation of the bountiful harvest this year. And yet this depot, though the principal, is not by any means the only one—in Buffalo, Chicago and Sandusky City, large quantities of grain are annually shipped, which never find their way to this port, but go directly abroad through the chain of great lakes and their tributary canals.

We compile from *Wells's Produce Reporter*, published in Chicago, a few figures relating to the amount of grain received there at different periods of the year. Total receipts of wheat for the week ending October 25, 1862, 436,691 bushels, of the value of $391,144; previously, since January 1st, 10,184,481 bushels, of the value of $8,755,385. Of corn there was received during the week ending October 25, 1862, 951,140 bushels, of the value of $313,751; previously, from January 1st, the whole amount was 26,677,877 bushels, of the value, *in toto*, of $7,858,511.

Look at the amount of grain, and then look at its value; and these are but two staples out of four or five great ones. Rye, oats, and flour we have not quoted at all. Up to October 25, 1862, grain to the amount of 36,862,358 bushels, of an aggregate value of $16,613,896, passed through one port of the great grain-growing countries of the West.

In connection with these figures examine the quantity produced in Iowa, as compiled from a journal published in that State. The yield of wheat is estimated at 20,000,000 bushels this year; being 1,750,000 bushels more than the crop of 1861. There have been 1,325,000 acres of corn cultivated this year, which will yield 76,250,000 bushels, or an excess over the crop of last year of 16,000,000 bushels. Oats will reach 10,000,000 bushels; hay, 1,000,000 tuns; sorghum sirup, 3,000,000 gallons; and potatoes double last year's quantity. What are the fables of the valleys of diamonds and mines of rubies and gems, compared with such solid and substantial wealth as this?

Like flocks of birds, hastening to the bounty we scatter to them, come ships from far over the seas to bear away some portion of the food which we cannot consume at home. The Cross of St. George, the yellow and black flag of Germany, the tri-color of France—one sees all these national emblems flying from vessels waiting to be loaded. Strangely-modeled, queerly-rigged, bluff-bowed old sailers some of them are, that have smitten Neptune many a sturdy blow, so that they might be bread carriers for the thousands abroad. One looks and almost wonders that the polacca of the Moor, or the camels of the Arab, are not awaiting their loads also, and asks himself where, among the congregations of the nations here assembled, are the tawny sons of the South with the sand of the desert or the bloom of the fig yet purple upon them, that they give not, as the travelers of old gave, wine and olives, and stores of myrrh and incense for the more substantial staff of life. Through the narrow strait that admits the puffing tow-boats which come dragging in the huge vessels, one catches glimpses of the ocean, the ships pursuing their way by the sun, and all the white sails of them who go down to the sea; and it requires but a slight stretch of the imagination to fancy their prows turned this way, and that they hasten hither for bread.

The elevators, by which all this grain is transferred from ship to store, or the reverse, as the case may be, do most of the labor which is involved in shifting it. By means of a long spout let down into the hold of a canal boat the grain is elevated into the top story, where it goes through a process of cleansing, which prepares it for transportation. There are six of them built on the dock, and ten floating ones, owned by persons doing business there, and it is surprising to see what quantities of dirt is screened from corn, rye or wheat, which seemed free from rubbish before; paper, cobs, stalks, refuse of all kinds, is rejected, and nothing but the grain itself returns into the ship's hold.

The number of vessels which annually load and unload their cargoes at the Atlantic Docks comprise one-eighth of the whole commerce of the port, and we are assured that as many as one hundred and five square-rigged vessels have been in the basin in one day. As the winter season approaches and the canals freeze up, the docks then become jammed full with canal boats that have come in here to be unloaded or await a market for their grain or flour. The shipping laws of the port are such that they cannot be restrained from coming if they choose to do so; as long as the wharfage is paid, just so long they have a right to seek refuge here, and they improve their advantage to such an extent that they are literally a nuisance; in every corner and chink they insert their square bows, so that one can walk over a pontoon bridge from one end of the basin to the other.

We have dwelt at length in this article upon the staple of grain, as it is at present the leading feature in the business of the Atlantic Docks; but this is by no means the only product of the world unloaded there, as we have remarked previously. A large force of laborers and stevedores crowd the wharves and lend their aid in transferring the vessel's cargoes. In busy seasons a scene of interest and activity is presented, which is unequalled, we think, by any thing similar in this port. The elevators keep up a low continuous roar, the dust falling thickly in a yellow shower from them; the sailors heave at their anchors, and the tow-boats, darting here and there, drag the ships swiftly away to the ocean. All this is seen in the transactions at the Atlantic Docks, and so, confined in the area we have spoken of, we may get a slight idea of the resources of the American continent and of its capacity to supply food and clothing to every nation on the globe. We say a slight idea, because these docks are only one out of many such concerns that line our shore; not, indeed, in the manner of transacting the business done there, but in the shelter, protection and dispatch afforded to shippers and consignees under their management.

We are under great obligations to President Stranahan and to Mr. McCormick, the able Secretary of the Atlantic Docks Co., for information and facilities afforded us; it is a sincere pleasure for the Press to come in contact with such gentlemen, and we appreciate it not alone as a personal attention, but as a courtesy to the profession and public in general.

Many other interesting matters and details were pointed out to us; but as our space is confined we cannot enlarge upon them.

A little below the wharves of the company Messrs. Henry Esler & Co.'s Atlantic Docks' Iron Works are located. These are large buildings, where this firm have, for a number of years past, carried on the manufacture of steam and other machinery; acquiring thereby extensive business relations with all parts of the country, and spreading their reputation wherever their machinery has been adopted. We visited these works lately and found a number of contracts in hand which, under the supervision of Mr. James Simpson, the energetic foreman, were progressing very fast. The company have just erected and put

in operation a new and convenient boiler-shop, which, we were assured, is among the largest in the country, being 200 feet long by 75 feet in width, completely furnished with steam engine, punches and all the tools usually employed in the prosecution of this branch of their business. The excellent water facilities which the site of these works affords, permit the largest vessels to come up alongside the dock and receive the machinery designed for them with great dispatch. At the time of our visit the Messrs. Esler had in course of completion the following engines and boilers: For the Union Ferry Co., two inclined engines of 38-inch diameter of cylinder, and 10-feet stroke, low pressure, fitted with the ordinary jet condensers; two boilers for the same, having 1,245 feet of heating surface in each. Engines for five propelers, now building by Van Deusen Bros., at the foot of Sixteenth street, New York, for Capt. Williams, of the Neptune Steamship Co.; these are twin engines, having cylinders of 44-inch diameter and 36-inch stroke; they are direct-acting and have jet condensers. The boilers are also building, and have a fire surface of 4,802 feet.

In addition to the above they are also building a small beam engine for Messrs. Sandford & Co., of 36-inch cylinder and 8-feet stroke, and have just completed two gunboats for the Government, which were approved and transferred to the Navy Yard a short time since. The force employed at present amounts, including men of all trades, to 380 workmen. The capacity of the works, however, will admit of a much larger number should occasion require it.

THE SCIENCE OF STEAM ENGINEERING

Not many months since a law was passed, requiring all persons in charge of steam boilers to have a certificate of competency from commissioners appointed to decide upon their fitness for their situations. In most instances, probably, this law has been complied with; in some others it has been wholly disregarded, in precisely how many, we have no means of ascertaining; accident, however, has revealed one case at least, where the person employed as an engineer had no legal proof of his capacity, and, as the issue proved, no mechanical fitness either; he blew himself up with half a dozen others.

We shall not make unfounded charges, or be entangled in any assertions which we cannot prove; and we say that, although this is the only case that we know of, as being directly contrary to the provisions of the law for such cases made and provided, we can refer to countless instances where men have received testimonials of efficiency for engineering qualities which they did not possess; the five dollars of their employer bought them a character at second hand. Now such a state of affairs may or may not be all right; it depends solely upon the light in which they are scrutinized. Engineering is a profession, it is not a trade, strictly speaking; it is not comprised in opening and shutting valves, in scientific flirts with an oil can, or in impertinence and vulgarity of demeanor when asked a civil question by an "outsider." It requires the closest attention, and both mental and physical labor, in order that the best possible results may be obtained; whoever does less than to devote all his energies to his profession, robs his employer and cheats the world of science of discoveries which he might have made had he used the faculties nature gave him. Admitting engineering to be a science and not a handicraft, we must then look for a high class of men to fill the situations, posts of honor and trust, which it opens out to the trade at large. No calling can be more productive of good results in respect to mental training than the one under discussion.

Familiarity with steam machinery, most especially with the boilers, is apt to beget a confidence in the ignorant, which is not born of a knowledge of the dangers and exigencies which are continually occurring during their working, and which is the offspring of conceit and the grossest folly; but contact with steam, a thorough elementary knowledge of its constituents, theory of action and production, only inclines the philosopher and the seeker-after-knowledge to be more patient and lowly in spirit when developing the mysteries of its sublime power, and applying the same to the arduous and monotonous task of doing the work of the world. A moment's reflection will show this to be the true light in which to view this matter, for in what other branch of the arts and sciences can we find another person into whose sole charge is given so much responsibility and power? The magazine he guards may spread havoc and ruin about if he impede the action of the feed, or neglect the valves which control the surplus pressure. If he be upon the railroad or in the crowded city, the weal or woe of multitudes is committed to his keeping; if he be upon the sea, in the shock of battle, when iron-clad answers to iron-clad, and the sea frets itself hoarse in the vain effort to overwhelm them, the fate of nations even is in his power; the cause of truth, of justice, and human rights, or the reverse of all these, lies hidden in the lifting of a valve, the lubricating of a rod or shaft, or the loosening of a gland or screw at the proper time.

These are not mere rhetorical assertions, they are living truths, every practical man knows it, and will give his testimony to the same effect; nor is it our purpose to especially glorify engineering above all other professions, but simply to direct attention to their peculiar sphere and duties, and to make them more conscientious in the discharge of their heavy responsibilities. Into their hands is given the wealth and property of the employer; not of one, but of many; conceive then the delay and hindrance caused by neglect or mismanagement. Let one man in a district of ten square miles be five minutes late in starting his machinery in the morning; and reflect if there be one in such a predicament within the limit proscribed, what a loss will ensue to the country at large, through all its towns and cities. Or if this be too impractical in its bearings, suppose one careless man in the same area to squander his employer's oil, his tallow, waste and small stores of all kinds; that man just as much robs his fellow craftsmen of wages as if he put his hand directly into their pockets, for the next one who comes after him will probably receive less to make up for the former's waste; thus, little by little, a trade or calling degenerates, until from being a profession or a science, it falls into the hands of incompetents and inexperts, and ceases to be anything more than a mere occupation.

Only by slow and sometimes painful degrees can we arrive at logical deductions; and the study of steam engineering—one of the noblest sciences that ever attracted the attention of man—affords an example of the truth of this assertion. Among the mightiest physical forces of the globe, steam knows no master but a watchful one; it acknowledges no attentions but those which are undivided and unalienated by any other pursuit. Many employers, in their ignorance of the qualities required in an engineer, cause him to devote the intervals of firing to some other branch of their business, to saw wood, and, in one instance that we recall, to attend to the care of a horse; having, perhaps, some faint idea that this was the best way to give the man a proper conception of horse power; this is not levity, it is not by any means funny; but only painful, as showing the estimation a noble servant of man is held in by those whose money is able to purchase its aid.

The relations of steam engineering and commerce are fully ascertained; it is not fitful in its action, neither spasmodic nor uncertain, but give its machinery undivided care and attention, and day after day it will go on its round of duty without cessation. The pressure will be evolved, the pistons rise and fall monotonously, and the whole grand and vast system of steam in this country will perform its functions without other derangement than such as usually falls to the lot of man's devices. It is only through attention to the subject of this article that superiority in it is reached; the expert attains to better results than the neophyte, yet the former was once awkward and rude in the science, and has only obtained his superior skill by a conscientious discharge of the responsibilities given into his keeping. If, therefore, each and every one in any way connected with the care of steam machinery resolves to raise the standard of their profession, the results will be apparent in a few years, in increased pecuniary benefit to themselves, and also to the arts and world of science generally.

When it is 12 o'clock, M., at San Francisco, Cal., it is 25 minutes and 48 seconds past 3 P. M., in Boston.

Subterranean Railroad in London.

A subterranean railroad has just been opened in London. It runs from Victoria street, Holborn, to Paddington, and three and a half miles of the route are finished. The work consists of an elliptical tunnel, perforated at the top at very short intervals for purposes of light and ventilation, and in its construction the engineers have witnessed a huge battle between science and sewerage. The complicated system of sewers through which the tunnel passes has caused great trouble; the wet still streams in on either side, and the odor is anything but agreeable. Nevertheless, by dint of severe application and a great deal of ingenuity, the tunnel is gradually becoming watertight and sweet-smelling, and on the experimental trip, three weeks since, six hundred passengers passed through without suffering material inconvenience. The London *Daily News* says:—

The tunnel is a magnificent specimen of brickwork throughout, with an arch over head of twenty-eight feet span, and a hight from the roadway to the crown of seventeen feet. As we have before said, throughout the greater portion of the line there is little more than a skin between the top of the tunnel and the street overhead, but in some places, in consequence of the well-known inequalities of the route, there are fifty-four feet of intervening stratum between the railway train and its rivals, the omnibuses. The line sweeps round nearly all the way in an easy curve, dipping at one place to a gradient of one in one hundred, but rising again as it approaches the city terminus. Practically speaking, a complete subterranean railway communication has been achieved between Holborn and Paddington, and a very short time indeed will be sufficient to make the whole line complete, and it must be confessed to be a very wonderful work.

A street engine for drawing ponderous loads is just introduced in London. Its first essay was successful, a wrought-iron girder weighing twenty tuns having been drawn over the pavements with ease and without accident. Its wheels are very wide, and it turns aside for vehicles as readily as a cart. Great crowds assembled to witness the performance as it passed through the streets.

If such engineering feats are accomplished in Europe, they can be here, and it seems perfectly feasible to construct a railroad tunnel in this city, upon the same principle; the passage of the main streets, Broadway, Grand and the Bowery, would be much easier for pedestrians, and the transmission of all sorts of merchandise greatly facilitated. The tunnels, however, need not be confined to railroads, but might be constructed so that every main artery of travel in this city should have its cut-off or outlet; in this way the city could be used on both sides, and the improvement consequent upon the introduction of a system similar to the one spoken of would soon be apparent. The only objection to the plan would be the water and gas pipes; perhaps these could be evaded by going below them. Politicians might also object to reaching their destinations by such a questionable route as an underground railroad, but we think that even their prejudices would be overcome in time. In respect to the street engines, we have had several machines in operation which could be adapted to the same work as the English one has performed. Should a tunnel be projected, they will have an excellent opportunity to exhibit their powers.

Food in Paris.—A French journal gives statistics of food in Paris, as compared with London. According to these the Londoner's nourishment is more substantial and invigorating than that of the Parisian. The consumption of bread is about equal in the two cities, but in London a large quantity of flour is used in family kitchens, in addition to baker's bread. Of butcher's meat twenty per cent more is eaten in London than in Paris—the difference of population, of course, being taken into account in all these estimates. Twice as much fish is used in London as in Paris. The consumption of butter, milk, poultry, and fruit is larger, however, in Paris than in London.

When Great Britain fought Napoleon, she made the Bank of England notes legal tender, and the premium on gold rose so high that twenty-one-shilling pieces rose to twenty-seven, but that did not prevent her from carrying on the war successfully.

Correspondence

Constructing Wagon Wheels.

MESSRS. EDITORS:—On page 280, current volume SCIENTIFIC AMERICAN, your correspondent, O. N. C., asks for the best mode of constructing wagon wheels and applying them to their spindles.

Ease of draft, strength and durability are the points to be considered. To accomplish these objects certain rules are indispensable. To understand these rules and their application we must examine closely the operation of a wheel on its axle. On a pulley or wheel in ordinary machinery, the propelling power or resisting force is applied to its rim or periphery. Not so with a wagon wheel, hence a different rule must be applied. The power of locomotion to a wagon wheel is applied just so far from its center as the periphery of the spindle comes in contact with the wheel. Hence the theory supported by so many intelligent wagon makers (which we leave for others to discuss) that "a wheel on a large spindle runs lighter than on a small one."

The lightness of draft can only be effected by doing away with all avoidable friction, and the mode of applying the power. Strength is obtained by a proper construction of the wheel and its proper position on its axle. To accomplish these objects the weight of the load to be supported must be equally distributed on each end of the hub; the face of the spoke must stand perpendicular, or at right angles with the base of the axle; and accordingly at right angles with the boxing or internal surface of the hub. Here lies the foundation of the taper of the spindle and the "dish" of the wheel. By applying the following rule it will be seen that one is entirely dependent upon the other:—Thus, a wheel 4 feet high with a hub 14 inches long, the butt box 4 inches and the point boxes 2 inches in diameter. Lay off this size on a draft board, draw a line through its center longitudinally; then draw another at right angles with the internal surface of the hub or boxing to the hight of the wheel. This line shows the face of the spoke perpendicular, or at right angles with the axles' base (which must in all cases be straight); draw another line at right angles with the line through the center of the spindle to the point of the spoke line. The distance these two lines radiate at the center of the spindle will be the proper dish of the wheels for this taper of spindle. But if the wheels be made and the amount of dish fixed, it becomes necessary to give the spindle the proper amount of taper to suit the wheel. To ascertain this, take the horizontal spindle line, the perpendicular spoke line (at right angles), the size and position of the butt box; then mark the dish of the wheel at the center and draw a line at this point across the spindle to the point of the spoke line. A line at right angles with this dish line to the center of the butt box gives the center of the spindle, thus ascertaining the exact size needed for point box to maintain the proper bearing of the axle on the internal surface of the hub.

Another important point, commonly called "gather," is the inward inclination of the front of the wheels to prevent them from running out against the nut or linch-pin when the wagon is moved forward. The difference between the motion of a wagon wheel and that of a pulley can be seen by placing a wagon with tapered spindles on a smooth floor. Move the wagon forward by applying the power to the rim of the wheel, as is the case in machinery, and it will be seen that the wheel inclines to run in or against the hurder or butt of the spindle. Remove the application of power from the rim to the center, as is done when the wagon is drawn by the axle, and the tendency is to run off or out against the nut. This result shows that some change is necessary in the construction of the spindle. To prevent this difficulty ascertain the difference between the size of the butt and point box, take one-third of this off the front and two-thirds off the back of the spindle. This will always give the wheels the proper amount of gather and is applicable to all sizes. Let the taper be half the size of the box as is customary on wooden spindles, or one-eighth of an inch, as is usual with small iron spindles.

These calculations are based on the supposition that roads are all level, while breakage of wheel or spindle mostly occurs on sideling ground, the load bearing outward at the axle and the rim is forced inward at the bottom. To give the wheel strength to resist this side strain it is best to use a long hub, and set the spokes forward and back or zig-zag as much as possible; thus obtaining a wider base at the point where the greatest strength is required. A long hub is also less liable to break the axle.

I have endeavored to describe all the lines necessary without a drawing, which makes the rule seem longer and more complex than when viewed on the draft board, and necessarily occupies more of your valuable space than is desirable. The subject being of great importance, and very improperly understood by many of your readers who are interested, I have endeavored to make it easily known.

J. R. GATES.

Louisville, Ky., Oct. 30, 1862.

Experiments with Petroleum as Fuel.

MESSRS. EDITORS:—In reading the SCIENTIFIC AMERICAN, No. 18 (this volume), I find that Prof. Seely, in the report of the Polytechnic Association, describes an apparatus he tried for burning crude petroleum. Allow me to give my experience on the same subject. Two years ago, I had constructed a furnace of tin, built in the same shape as that used for all horizontal boilers, and over this I put a tin boiler. The bottom of the furnace was made in the shape of a box with the upper part of it perforated by a number of small holes. This box was to contain the oil to feed the fire, and I fed it gradually through a pipe leading from a tin can full of oil to the bottom or box of the furnace. The supply was regulated by a cock. Over the perforated part of the furnace box, I put sawdust and then let the oil into the furnace box, and it passed through the small holes in the top of the box and saturated the sawdust. I then lighted the fire, but soon found that the fire did not receive a sufficient quantity of air to burn without smoking. An opening which I had left in front of the furnace for the supply of air was found insufficient. My next experiment was then to get made a tin cup with two false bottoms, each forming a box. I then had a number of short brass tubes inserted into the cup, running through the top box, one end opening into the lower box and the other into the cup. The top box contained a small quantity of oil fed to it from a can, as in my former experiment. The bottom box was to be an air box; and I had a pipe inserted into it through which I forced a current of air in order to supply the fire through the short brass pipes. As before, I spread sawdust over the small holes in the top box and let the oil into the top box and applied a match. After a short period I began to blow a supply of air to the fire through the lower box and brass pipes, and I obtained a steady fire and as free from smoke as I could expect from such an imperfect apparatus. I placed the boiler of a small steam engine over the cup and in a very short space of time raised sufficient steam to work a small engine. Very soon the pressure of steam increased to such a degree that steam began to blow off freely through the safety valve.

As I stated before, these experiments I tried two years ago, and my last experiment is very similar to that of Prof. Seely. C. COLNE.

Washington, Nov. 3, 1862.

An Ancient Iron-Clad Battery.

MESSRS. EDITORS:—I notice in the last issue of your interesting publication an article devoted to surmises as to the originator of iron-plated towers. Your correspondent ascribes it to a person living in 1848; but he is entirely mistaken. For this idea we are indebted to the ancients. Demetrius, son of Antigonus, King of Macedon, laid siege to the city of Rhodes. He experienced a very obstinate defence and all the arts of ancient warfare were directed against the place. A tower was raised, and it is described by an ancient historian as "a monstrous machine the base of which was seventy-five feet wide on each side; it was composed of square beams riveted together with iron bolts and carried up to the hight of nine stories; to render it proof against fire, three sides of it were coated with plates of iron." Strenuous attempts were made by the Rhodians to burn or take this tower, but they were unsuccessful in destroying it. Demetrius, however, fearing that the persistent efforts of the besieged would eventually effect the destruction of a machine on which he had wasted so much time and treasure, removed the tower from close proximity to the walls. The citizens soon after capitulated, and Demetrius made them a present of all the machines with which he had operated against their city. The Rhodians sold those machines for $330,000, which sum was applied toward building the famous "Colossus of Rhodes." The siege took place B. C. 303. E.

Utica, Nov. 10, 1862.

Soldering Tinware.

MESSRS. EDITORS:—You will confer a favor on me by informing me of the address (through the SCIENTIFIC AMERICAN or otherwise) of a manufacturer of lamp burners. I mean the small, round tube kind.

I have just found that the material of which star candles are made is a very excellent substitute for resin in soldering tinware. It might oblige my loyal brother tinners to be informed how they can be independent of the rebellious owners of the Southern pines.

I have no news yet of my application for a patent on a fruit-can machine. Is it a "red tape" regulation that my neighbor should have his patent in six weeks, and that I should not hear from mine in twice that time? S. HUNT.

Danville, Ind., Nov. 5, 1862.

[Your substitute for solder may answer a very good purpose, but we should think it more expensive than resin even at the present high price of the latter.

We expect a decision on your fruit-can machine every day. Your neighbor's application for a patent was examined and ordered to issue by another examiner than the one before whom your case comes.

Manufacturers of lamp burners will please to send their address to Mr. S. Hunt as above.—EDS.

The Tax Upon Castings.

MESSRS. EDITORS:—Your article on "Taxation of Castings," in issue of November 1st, must be incorrect, as there is a decision by the Commissioner of Internal Revenue, published in the New York *Tribune* Oct. 21, 1862, in which he states as follows:—

First, All castings which are so well and generally known as to have a commercial value, must be taxed as manufactures when sold and removed from the manufactory.

Second, Other castings made upon speculation of a machinist, but which are not known to the trade as manufactures in themselves, and are designed for articles subject to taxation in an advanced state, are exempt, not being manufactures in the contemplation of the law. It may be difficult to draw the line; the assessor's or assistant-assessor's best judgment will be required. As, for example, car wheels belong to the first class.

This decision needs explanation. In what sense is the word "speculation" used? Please give us the law if you can find it out. C. VAN BRUNT.

Fishkill Landing, N. Y., Oct. 28, 1862.

[The above decision and the remarks of our correspondent afford proof that the article in the SCIENTIFIC AMERICAN referred to, is *not* incorrect. He has justly remarked that this decision "needs explanation."—EDS.]

Trial Trip of the Steamer "Union."

The splendid new screw-steamer *Union*, designed for the trade between New York and Havana, Cuba, made her trial trip on the 10th inst. She is of fine model, 210 feet in length, 34 feet beam and 17 feet depth of hold. The *Union* was built at Mystic, Conn., by Mallory & Son, for Messrs. Hargous & Co., and her machinery at the Delameter Iron Works, this city. Her engines have cylinders 36 inches diameter, and a stroke of the same length. The screw is 13 feet diameter, with a pitch of 18 feet. The propeller made 66 revolutions per minute on the trip.

FALL OF A BAKERY.—The wall of a new building in process of erection for the bakery of Hecker & Brothers, on the corner of Rutger and Monroe streets, in this city, fell with a terrible crash on the evening of the 10th inst., and buried a tenement-house in the rear, killing one person instantly and wounding two others. It has been asserted that the walls were too feeble to suppport the immense weight of ovens erected upon some of the floors.

Diseases and Treatment of Fowls.

In M. Jacques' work on "Poultry" he says: "A barbarous custom, as ridiculous as it is abominable, consists in tearing off the horny tip of the tongue in order to cure the malady called the pip, and which is only canker or *apthe*. This substance is as natural to the tongue as the nail is to the finger. I have seen people take a sick hen, examine the interior of the beak, then seeing it was suffering from canker or *apthe*, take a pin and tear off the end of the unh appy patient's tongue. As a precautionary measure all the birds in the yard were examined. As they a l had the horny tip, it was settled all were about to suffer from canker, and then all hands set to work to mutilate the entire poultry-yard. The wound it causes is long in healing, and somtimes incurable. One of the most dangerous maladies, because in time, and almost imperceptibly, it will invade a whole yard, young and old, is a disease I will call the 'white.' It is a sort of itch, evidently caused by invisible vegetations, which appear first on the feet, on the combs, on the wattles, on the cheeks and on the deaf-ears, in the form of small flour-covered patches. These patches extend and thicken till they stop the ear, form crusts on the face, make holes in the legs, raise up the scales and cause them to fall and at last invade the whole animal. As soon as the appearance of white is ascertained, a remedy is at hand which is a certain specific. It is merely sulphur ointment, the receipt for which is powdered or flowers of sulphur and lard or hog's fat in equal quantities. These two substances thoroughly kneaded together for a long time will form a very thick ointment, which should be abundantly applied. If the white is of old date and very floury, a cutting instrument should be used and the parts scraped with it to the quick, even in the most difficult places; the ointment should be abundantly applied, and renewed every third day till a cure is effected.

"The ointment should be applied wherever it is necessary, care being taken to raise the feathers in layers, so that the animal shall not be greased all over. To conclude with a general rule, every fowl sick of any malady should, if a cure is desired, be put by itself, and fed with refreshing food such as millet, dough made of barley flour, grass and very clean water complete the treatment. As fast as the birds are cured they are let out to regain strength and vigor in those places where there is the greatest amount of vegetation."

Restlessness at Night.

Sleeplessness in many cases is caused by nervous affections. Intense activity of the brain, over-exertion, grief and other mental distractions also exert an influence over the body which prevents the nerves and muscles from relaxing sufficiently to produce that perfect quiescence of all its members necessary to healthful slumber. Various remedies have been proposed for it. The late Washington Irving was in the habit of getting up when afflicted with this malady, and either shaving himself or else slowly pacing up and down his room until nature was overtaxed and demanded rest. Artificial remedies, such as drugs, generally react upon the system, and much injury results from their employment. We have found a most efficacious cure in our own case to be the application of cold water to the body; beginning at the small of the back and continuing to bathe it and the legs until a healthful glow and reaction is produced. In winter or summer this plan is decidedly agreeable and has the merit of simplicity at least. The blood which was sluggish in its circulation is stimulated naturally, and no relaxation is perceptible, as is the case with stimulants or narcotics of any kind. People of nervous temperaments know what intense suffering results from the want of sleep; and physicians and philosophers are also cognizant of the losses the world has sustained through bodily weakness and debility in great men, no matter what their profession may be. Any remedy therefore, that promises immunity from this disease will be truly an acquisition to the world at large.

The gunny bag of our commerce is woven from the fiber of a plant grown in India, called *goni*. The cultivation of the plant gives employment to hundreds of thousands of the natives. An English company for its cultivation is established in Calcutta, with a capital of £300,000.

The Sea Serpent Caught at Last.

It will be remembered that the Cape colonists, although profiting perhaps more largely than any of our foreign possessions by their connection with the mother country, magnanimously refused to vote a shilling to the sending over contributions or commissioners to the Great Exhibition. A private individual, Mr. Ghislin, of Hatton-garden, has endeavored to some extent to make up for this want of colonial liberality. Mr. Ghislin's contributions are all contained in two small cases, but they are not without interest, the more especially as one of them professes to solve the mystery (so long a *pièce de resistance* with the American newspapers) of the great sea serpent. Mr. Ghislin asserts that the monster that has frightened mariners both young and ancient is nothing but a species of sea-weed, which, when forced to the surface in oceanic commotions, floats about in masses sometimes a thousand feet long, and, to a nautical imagination, presents the appearance of the sea monster which from the days of Bishop Pont-Oppidan down to the present has been the subject of so many marvelous descriptions. Mr. Ghislin, nothing daunted by the traditions, has boldly seized the leviathan, brought him to land, and, having squeezed him into a substance called "laminite," has turned him into excellent handles for knives and razors, and put him to various other purposes to which gutta-percha, india-rubber and, more commonly, German staghorn have been hitherto employed. As the supply is inexhaustible, this laminite may turn out to be a very valuable contribution to the material of industrial art.—*Daily News.*

Sorghum Sirup Manufacture.

We learn from the *Prairie Farmer* that thirty barrels of sorghum sirup are now daily manufactured at Loda about 100 miles south of Chicago. Two sets of 30-inch rollers are used for crushing the cane, and they crush at the rate of 24 acres of stalks in 24 hours. The juice runs from the crushing mills through strainers into a tank, from which it is forced by a pump to the top of the building and from thence it passes down into clarifiers, which are heated with steam. About 400 gallons of juice are received at once into a clarifier, and some lime water is mixed with it to prevent it from becoming acidulised. The scum is taken off frequently while the juice is kept in a heated condition, and when it becomes clear it is drawn off into another tank, allowed to settle for a short space of time, then run into evaporating pans, and concentrated to 36° Baume. After this it is drawn off into iron coolers and subsequently put into barrels, for transportation. About 40 persons are employed in the establishment in two gangs for day and night work. It requires over 20 teams daily to draw the cane from the field to the manufactory. All this juice is sent to be refined in Chicago. Some cane yields far more juice than others; the yield is stated to vary from 80 to 200 gallons per acre.

Discovery of a Great Copper Boulder.

We learn from the *Mining Gazette* (Houghton, Mich.) that a great mass of copper has lately been discovered on the Mesnard section in that district. Little of the mass was above the surface when discovered, and that little was so covered by moss and small underbrush as to hardly attract attention. Upon being uncovered, and the soil removed from around its sides, traces of Indian workings were found—pieces of charcoal, and half a dozen stone hammers were taken out; and the eastern end of the mass shows plainly that a portion has been broken off. The average dimensions are—length 15 feet 7 inches; width, 3 feet 7 inches (it is full five feet in one place); thickness, 1 foot 6 inches; giving 87·135 cubic feet. All these measurements are rather under than over the average, One measurement gave 120 cubic feet, but we consider the first figures the most reliable. They would give the weight of the mass as 23 tuns, 1,924 lbs. There is but little vein rock attached to the block. Two pieces, one from each end, have been cut off the mass. Where it is cut through, the mass is pure copper and very compact. The two pieces have been taken to the smelting works and weighed 5¼ tuns.

The Government has advertised for two thousand head-boards for graves. They are to be of black walnut, clear of knots, four feet long and ten inches wide.

The Walled Lake.

A wonderful walled lake is situated in the central part of Wright county, Iowa. The shape of the lake is oval. It is about two miles in length and one in width in the widest part, comprising an area of some 2,000 acres. The wall inclosing this area is over six miles in length, and is built or composed of stones varying in size from boulders of two tuns weight down to small pebbles, and is intermixed with earth. The top of the wall is uniform in hight above the water in all parts, which makes its hight to vary on the land side according to the unevenness of the country, from two to twelve feet in hight. In the highest part the wall measures from ten to twelve feet thick at the base, and from four to six at the top, inclining each way, outward and inward. There is no outlet, but the lake frequently rises and flows over the top of the wall. The lake at the deepest part is about ten feet in depth, and abounds with large and fine fish, such as pike, pickerel, bass, perch, &c. The water is clear as crystal, and there is no bubbling or agitation to indicate any large springs or feeders. Wild fowl of all kinds are plenty upon its bosom. At the north end are two small groves of about ten acres each, no timber being near. It has the appearance of having been walled up by human hands, and looks like a huge fortress, yet there are no rocks in that vicinity for miles around. There are no visible signs of the lake being the result of volcanic action, the bed being perfectly smooth and the border of regular form. The lake is seventeen miles from Boon river on the west, eight miles from Iowa on the east, and about one hundred miles from Cedar Rapids. It is one of the greatest wonders of the West; so says an exchange paper.

How to Make Potato Starch.

It is not generally known, as it should be, that starch made from the common potato furnishes an excellent substitute for arrow-root, as a wholesome nutritious food for infants. It also makes a good cheap pudding for the table, if cooked like sago, and as it has not the medicinal properties of arrow-root, it is much to be preferred as an article of daily food, except for children who are subject to diarrhœa or summer complaint. The process of making the starch is simple and the time required so short as to put it into the power of every one having the means at hand. Wash any quantity of potatoes perfectly clean, and grate them into a tub half full of clean cold water; stir it up well; let it settle, and then pour off the foul water; put the grased potato into a fine wire or coarse hair seive; plunge it into another tub full of clean cold water, and wash the starch through the meshes of the sieve and throw the residue away; or wash it again if any starch remain in the pumice; let it settle again, and repeat this process until the water comes off clear; scrape from the top any remains of the pumice; then take the starch out and put it on dishes to dry, and it will be fit for use immediately. When wanted for use, mix as much as may be needed in cold water, and stir it into boiling milk, or water if preferred, and it requires no further cooking. It also makes a stiff and beautiful starch for clearing thin muslins or laces, and is much less troublesome to manage than that made of wheat.—*American Agriculturist.*

To Prevent Accidental Drowning.

Any human being who will have the presence of mind to clasp the hands behind the back, and turn the face toward the zenith, may float at ease and in perfect safety in tolerably still water—aye, and sleep there, no matter how long. If, not knowing how to swim, you would escape drowning when you find yourself in deep water, you have only to consider yourself an empty pitcher—let your mouth and nose, not the top of your heavy head, be the highest part of you, and you are safe. But thrust up one of your bony hands and down you go; turning up the handle tips over the pitcher.

Varnish and Whitewash.—A very free flowing black varnish is made with one pint of Canada balsam, four of bitumen (Judea), and four of chloroform. A thick wash composed of lime, some salt, a little molasses and some fine sand, applied to shingle roofs, render them nearly fire-proof and ar more durable than others not so covered.

Improved Projectile Lathe.

We reproduce from our foreign files an invention by Mr. Joseph Whitworth, of England, of a lathe for turning projectiles for rifled guns. It turns both ends of the shot or bolt at the same time, and prepares the base for any material that is intended to be put upon it; performing in short, all the operations that are requisite to finish the projectile without removing it from the lathe.

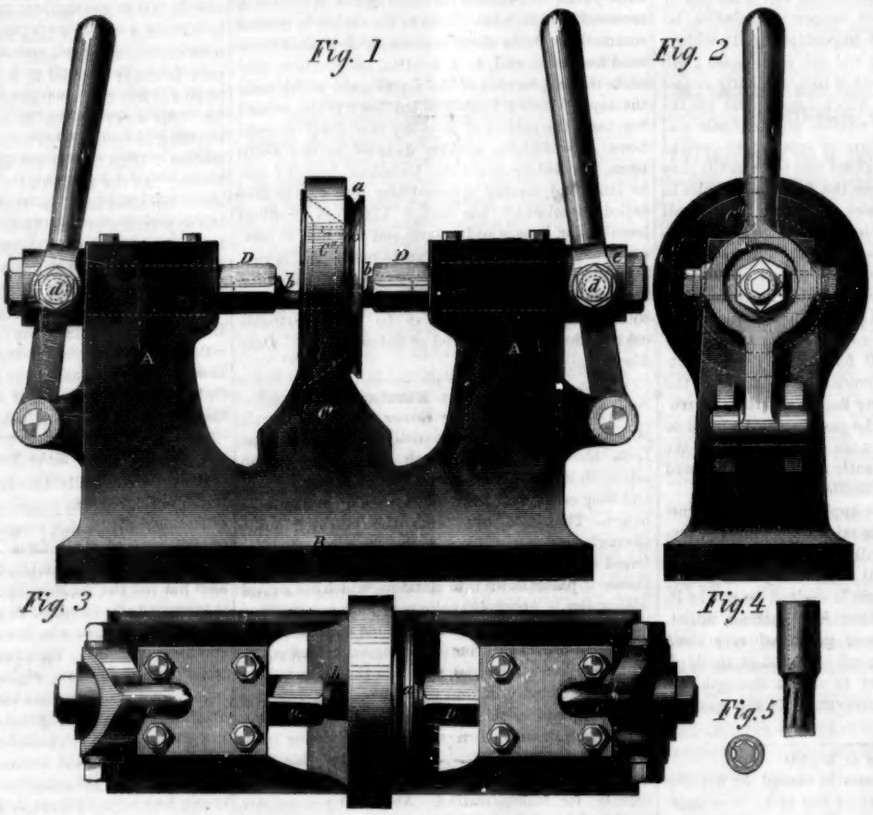
The following description will render the engraving intelligible:—A A are two tail stocks which are cast upon the frame, B; the standard, C^1, is cast on the bed, and has a chuck or die, C^2, which revolves in it by means of a belt running over the pulley, *a*. D D are two sliding spindles which have tools *b b*, of a particular shape, that are designed expressly for their work, fastened in them. These tools are brought up to, or drawn from, the shell or projectile by means of the handles, *c c*, which extend upward. The handles have pins, *d*, inserted in them, which work between two adjustable collars, *e*; through them the length or distance to which the spindles project is limited and the work accurately gaged each time.

The lathe is intended more expressly for many-sided projectiles,—such as are used in some rifled guns; but by making the die or chuck in two parts, cylindrical or indeed shot of any form, may be turned; the die being afterward tightened up by any mechanical device usually employed for that purpose.

Fig. 2 is an end view of the invention in which C^1 is the standard, and C^2 the chuck. The other parts may be easily comprehended.—Fig. 3 is a plan of the lathe and shows the pulley, *a*, spindles and tools, *b*, much the same as in the side elevation.

Figs. 4 and 5 are illustrations of a tool employed for lubricating the shot. It consists merely of a piece of iron bored out and rifled internally in a manner corresponding to the gun for which the projectile is intended. The shot is then put in the case and pushed down to the bottom of the bore opposite the apertures, *a*. These are cut entirely through the instrument so that when it is dipped into any lubricator the substance will flow through the holes and surround the bolt or shot with a coating of the material employed for the purpose. On being pushed out by the way it entered it is found perfectly lubricated.

The lathe seems well adapted to its object, and we think such a tool might be advantageously employed in the manufacture of some of our own projectiles.



WHITWORTH'S LATHE FOR TURNING PROJECTILES.

THE SAFETY VALVE.

To the boiler belong certain fixtures, the steam gage, the gage cocks, the stop and safety valves. Other instruments are appended, but these constitute the principal ones. Each and all of these fixtures require care and attention, the safety valve at least as much as any of them; it is the brass and iron brain of the boiler, and to it belongs some functions, which, when they are fulfilled, give moral support to the engineer, by assuring him that should he by any possibility overlook some portion of his duty, and accumulate an undue pressure, it will act the part of a faithful sentinel, and hiss an ominous warning of approaching danger. Considering its importance then, one would suppose that great attention would be given to it, but too often, we are sorry to say, it is not only improperly constructed, but suffered to stick fast in its seat, the stem of it to corrode in the bonnet, and the condition of its joints and their attachment to the lever, left in such a state as to utterly nullify the object for which it is intended. We have seen safety valves that had glands and packing boxes, and some which had their several parts as rigidly fitted as if they were intended for fixtures. This is all wrong; a boiler to be considered safe must have the valve which insures that condition properly proportioned and attached; to comply with the first requisite, it must be of sufficient area to relieve the boiler suddenly if required, and to conform to the other qualities specified, the joints should be free, the lever properly hung and weighted, and the mechanism in all its features so arranged as to answer the purpose for which it was intended. It is then what its name implies, a safety valve. Too often, in our accounts of boiler explosions, we read that the safety valve was inoperative and had the appearance of having been a long time unused. A slight pull on the lever will tell if it be in working condition, not merely when the steam is up, but when the boiler is cold; in the former case the pressure blows it off its seat, and a personal inspection will be more reliable.

Valves that suffer steam to escape, are the same as a leak in the employer's pocket; they permit just as much money to dribble out as it took to produce the feathery puff resolving itself into the air, while those which are inoperative and useless, soon make the criminal neglect manifest which has suffered them to become so, by spreading disaster and ruin around.

THE NEW ATLANTIC TELEGRAPH.

The project of laying a new Atlantic telegraph cable is now being seriously discussed. Messrs. Glass & Elliott, of London, propose to construct the cable and subscribe £25,000 ($125,000) to the capital of the company. Great improvements have been made in the construction of submarine cables since the one was laid in the Atlantic, a few years since. At the late meeting of the Scientific Association held at Cambridge, Dr. E. Esselbach read a paper on this subject, in which he stated that the insulation of the cables between Malta and Alexandria was 2,000 times better than was that of the Atlantic cable. The Malta and Alexandria line consists of three sections of 230, 500 and 600 miles in length, and they have been working for a year. In view of these facts, we may expect the construction and laying of a new Atlantic cable at no very distant day.

A Novel Trap for Killing Rats.

The premises of a good many farmers are infested with rats, and we are often asked for modes of destruction. A resident of Brooklyn is vexed with an increasing family of rats that seem to grow fat on arsenic and rat-exterminators. He does'nt like rats, and refers his case to the New York *Sunday Times*. That journal recommends a trap made as follows:

"Take a mackerel barrel, for instance, and fill it to about one-third of its hight with water, and place a log endwise in the water, so that one end of it will just remain above the surface.—Make the head of the barrel a little too small to fit, and suspend it by two pins to the inside of the top of the barrel, so that it will hang as if on a pivot and easily tip by touching either side. On this head, thus suspended, secure a piece of savory meat. The first rat that scents it will, to get the meat, leap upon the barrel head. The head will tip, or tilt, precipitate him into the water and resume its position. The rat in the water will swim to the log, get on the end of it, and squeal vociferously. His cries will bring other rats, all of whom will fight for the only dry spot in it, namely, the end of the log. As only one rat can hold it, the victor will drown all the rest, and can, in the morning, be drowned himself. We have seen twenty rats caught in one night by such a trick."

We tried this barrel trap for several successive nights, but never caught a rat.

Naval Preparations.

There is unusual activity in all the ship-yards of the country, fitting out vessels-of-war intended for operations against rebellion. In the last six weeks thirty gunboats have been fitted out in the Boston, New York, and Philadelphia navy yards, carrying 221 guns, and all the vessels are steamers. At Portsmouth and Washington the work has been equally as rapid and extensive. The destination of these vessels is purposely withheld. In the West the movements are quite as extensive, and a land and naval expedition, under General McClernand and Admiral Porter, is to be a very formidable enterprise, the object of which is to open the Mississippi, so that a single obstruction shall not remain. Colonel Ellett's ram fleet is to have a prominent position in the flotilla. The boats composing it have been thoroughly overhauled and put in condition for a winter's campaign. They can be used as rams in an action with the enemy's boats, and can perform valuable service in conveying transports through dangerous portions of the river. They are armed with boat howitzers and 12-pound guns. The *Switzerland* will be the flag-boat of the ram fleet. She has been completely casemated in every part, and will be able to do excellent service should opportunity offer.

The Scientific American.

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VOL. VII. NO. 21.....[NEW SERIES.]....*Eighteenth Year.*

NEW YORK, SATURDAY, NOVEMBER 22, 1862.

AN IMPORTANT CRISIS IN THE HISTORY OF NEWSPAPER PUBLISHING.

This is a time of severe trial to all newspaper and book publishers; and the prosperity—yea, the very business existence—of many of them is suspended upon a slender thread. That hitherto great national blessing, cheap literature, is likely for the present to receive a severe shock, and possibly its death-blow. We will take the case of the SCIENTIFIC AMERICAN as an illustration of what we have to say on this important topic. For nearly eighteen years this journal has not failed of a single weekly issue; and during that long period we have devoted our best energies and a large amount of active capital to make it the best as it certainly is the cheapest journal in the world devoted to popular science. At the commencement of the "new series"—July 1859—we enlarged the size of the SCIENTIFIC AMERICAN at least one-third, without increasing its rate of subscription. This was done at a greatly-increased cost to us; but notwithstanding this, and in spite of the great "rebellion" and the consequent stoppage of its circulation in all the seceded States, the SCIENTIFIC AMERICAN has gone on, steadily and prosperously, holding its own with the most favored journals of the land. We have regularly, and at a vastly-increased expense to us, given to its patrons, each week, a sheet of 16 pages, printed on the best quality of paper, manufactured expressly for us; and we have profusely illustrated each number with the finest specimens of engravings, prepared expressly by our own artists. In short, we have spared neither time, talents nor money in furnishing a paper which, considering its low price of subscription, is justly regarded as a marvel among the enterprises of cheap literature.

At length a crisis has reached us when we must earnestly consider how far we can continue to maintain this standard of excellence at the present subscription price of the SCIENTIFIC AMERICAN; and, in order that our thousands of readers may fully understand the difficulties that now beset the entire publishing interests of the country, we will explain the matter fully. It is safe to say that the newspaper press of the United States is unrivaled for combined cheapness and enterprise; but, with very few exceptions, no journal has flourished without a large share of *advertising* patronage. To rely upon the mere circulation of a paper, at the current subscription rates, would soon exhaust the pecuniary means of most publishers. Take, for example, the three leading two-cent "dailies" now published in this city, namely, the *Herald*, *Times* and *Tribune*, if without a large advertising patronage—the greater the circulation the greater the loss to their proprietors. The public, while enjoying the blessings of a cheap press, does not often take this fact into account; yet it is nevertheless true. We have never sought for the SCIENTIFIC AMERICAN a large advertising patronage, but have always desired to give our readers the fullest possible benefit of our columns for illustrations and reading matter; had we not, however, enjoyed a large *professional* business, we could not have sustained the paper without a large advertising patronage or an increase in the price of subscription. The war now being waged for our priceless national heritage is working sad mischief to the newspaper interest. A heavy tax is laid upon white paper, also upon advertisements; but these two items we should cheerfully pay as a moiety of our proportion of the war expenses; these, however, are not the worst difficulties that we have to encounter. Owing to the great scarcity of the raw material from which paper is made, the price of the manufactured article has advanced to very nearly fifty per cent, with a prospect of a still greater advance before the first day of January; and it is even intimated that the supply of paper cannot meet the wants of the publishers. Paper-makers will not and cannot, prudently, enter into contracts to supply publishers. They will only sell from week to week at their own prices; and, as usual, speculators are busy in getting hold of every article that goes into the manufacture of paper, with a view still further to enhance the price of the manufactured article.

With this preliminary explanation we come to the vital question at issue, namely: "How shall we adequately meet these contingencies, keeping our own interests and the interests of our generous patrons equally in view?" At the present price of paper our terms of subscription do not pay for the unprinted sheet, to say nothing of the great outlay of type, composition and presswork; hence we are reduced to the alternative of either reducing the size of the SCIENTIFIC AMERICAN or of advancing its subscription price. On the first day of January, 1863, we shall enter upon a new volume. We wish to not only keep our journal fully up to its present standard, but to make its acknowledged excellence to advance as much as it is possible for us to do. We have, therefore, decided to raise the price of single subscriptions to $3 per annum, with a corresponding reduction to clubs, as heretofore. We think this course will best satisfy our patrons; and we assure them that as soon as the time arrives when we can do so, we shall gladly reduce the rates to the old figures. The matter is now with our hitherto-generous patrons; and, if they still regard the SCIENTIFIC AMERICAN as being valuable to them, we trust they will continue to take it. We shall do our best to furnish them with a liberal equivalent for their continued subscriptions.

SLACKNESS AT THE PATENT OFFICE.

Nothing is more true than that the lack of constant employment begets indolence. When the Patent Office was crowded with business we seldom had occasion to complain at any delay in the examination of cases or lack of promptness in disposing of business in this bureau. But during the last year, and especially the past six months, there has been a noticeable slackness in several departments of the office, for which there is no apparent reason, except upon the principle that "the less one has to do, the less inclined and apt is he to perform well what he has to do."

In 1860 more than twice as many applications were made for patents as are likely to be made this year (1862); and but little, if any, more "help" was then employed in the Patent Office than there is now; still cases are not as promptly acted upon, in some of the examiners' rooms, as they were in that year of great prosperity. The delay in examining and giving decisions upon cases discourages inventors and creates dissatisfaction, which the Commissioner should try to avoid. Some of the examiners, we are happy to say, keep their work well done up, and give a decision in a case within a few days after the application is filed; but there are others who are several months behind in their examinations.

Now, if some of the examiners have so much to do that they cannot get through with their work promptly, why are they not relieved and part of their cases sent to less crowded rooms? There is certainly a sufficiently large examining force in the Patent Office to keep all the work done up snug; and we trust the Commissioner will see to it that the labors of the office are so distributed that no examiner may excuse himself from not acting upon cases which have been before him for several months, on the ground that he has not yet had time to take the matter up for examination. Will the Commissioner infuse a little more vigor in some of the departments of the Patent Office?

THE CONTINENTAL TELEGRAPH.

The Atlantic has been united to the Pacific by an electric cord 3,500 miles in length, and through this, the largest electric circuit in the world, messages were flashed on the 6th inst. New York and San Francisco now hold daily converse. This is one of the grandest commercial and scientific achievements of the age. The history of the electric telegraph is as wonderful as the story of "Aladdin's Wonderful Lamp." It is but eighteen years since the first line of telegraph was laid on our continent, between Washington and Baltimore, and now more than 50,000 miles of wire throb daily with messages of love, hope, fear and business, conveyed between every city and almost every hamlet in our land. When our first line was laid California was almost an unknown land, and was in the entire possession of the wandering Indian and the degenerate Spaniard; now a splendid Pacific empire, belonging to the Union, exists on the Pacific, and its numerous prosperous cities and villages give proof of the intense energy and enterprise of our people. In 1861 the continental line of telegraph was commenced by parties starting from Fort Kearney for the West, and from Sacramento for the East, and both pushed toward Salt Lake City at the rate of from eight to ten miles per day. This overland telegraph has been working for about a year, in conjunction with the "Pony Express," and now the entire line, from ocean to ocean, is completed, and the voice of the Atlantic is echoed by the Pacific in a few seconds of time. Let us cherish the hope that a railroad across the continent will soon follow the telegraph.

GENERAL MITCHELL.

Among the many distinguished persons who have fallen victims to our unhappy war, none seem to be more generally regretted than Ormsby McKnight Mitchell, the astronomer General. His death resulted from malaria fever, and occurred at Beaufort, S. C., on the 30th of last month. When news of the event reached this city the public heart seemed deeply moved with a sorrowful impulse. General Mitchell was born in Union county, Kentucky, August 28, 1810, but he removed when a youth from that State to Lebanon, Ohio, where he received a cadet's commission to obtain a military education at West Point. From Ohio to the Hudson he traveled a great part of the way on foot, and when he arrived at his destination all the material wealth which he possessed in the world consisted of fifty cents in his pocket and the clothing bound on his back. In 1829, he graduated with a high reputation in mathematics, and for a few years subsequently he acted as one of the assistant professors in our national military academy. After this he returned to Ohio, and in 1834 became Professor of Mathematics and Astronomy in Cincinnati College. In this situation he acquired deserved celebrity as a teacher of his favorite science and as a popular lecturer. In many of our cities he has delivered courses of lectures, and most lovers of science in this country have been both instructed and delighted with his eloquent descriptions of "the starry heavens." He was of medium hight, possessed of a wiry frame and was endowed with a clear intellect and great energy of character. The Observatory at Cincinnati was erected through his suggestions and instrumentality, and he devoted an immense amount of thought and labor to have it furnished with superior philosophical instruments. In conjunction with the late Dr. John Locke he was very successful in designing and obtaining valuable and ingenious mechanism for recording astronomical observations. It is stated that he discovered the exact period of the rotation of the planet Mars, and by two published works on astronomy his fame as a scientific author was widely extended.

In 1859, General Mitchell became chief director of the Dudley Observatory at Albany, N. Y., maintaining at the same time his connection with the Observatory at Cincinnati. While thus engaged he was

roused from his contemplations of the heavenly bodies to go forth as the leader of armed squadrons on the battle-field. His military education and known energy led to his selection as an eminently qualified commander in the West where he was so well acquainted. For successful dash and daring he acquired great distinction in several expeditions which he commanded in Tennessee and Alabama. It has been stated that owing to some misunderstanding with General Buel he was removed from his position in the western army, but it was only to be appointed chief military commander of the Department of South Carolina as successor to General Hunter at Hilton Head. He had been only a few weeks in this new situation when his decease took place, but in that brief period he had endeared himself to all those placed under his authority. As a man he was much beloved by his personal acquaintances for his kindness, courtesy and social qualities; and on his tomb might not inappropriately be inscribed the motto—

"Astra castra, Numen lumen."

("The stars my camp, the Lord my light.") We enjoyed the personal acquaintance of General Mitchell for several years, and always esteemed him as an upright, able man. His death entails a loss to the country—a loss to the world.

IMPROVED TOOLS.

The progress of any particular trade is strikingly exemplified in the machinery by which it is carried on. It is not a great many years since hand labor was the rule and machinery the exception in our manufactories, but within a comparatively short period, the most wonderful changes have taken place. Slow, laborious and costly operations have been supplanted by quick, facile and economical ones, to the great advancement of the arts, sciences and improvement of the world in general. It is not visionary to say that the civilization of any quarter of the globe is mainly due to the proportion and extent of its factories, in a direct ratio with the number of labor-saving machines in use; we could show this to be the case by the mere mention of the principal nations of the earth, and by enumerating the productions of their looms, workshops or laboratories. It is not, however, our intention to go to any such length to illustrate the advantages and benefits resulting to mankind through the employment of machinery. The victories of Peace are greater than those of War, for the reason that the former builds up the world, while the latter overturns and destroys it; but the triumphs of the arts and sciences follow in the wake of the warrior and repair the mischief which his fury has caused. We are led to these remarks by reflecting upon the vast number of inventions that come under our notice. Look at an iron or wood turning lathe for example. Time was, at a period not remote, when any apparatus that would swing a piece of iron between two centers, and revolve the same against a steel tool with sufficient power to take off a thin, corrugated, insignificant chip, was thought to be a miracle of mechanical skill and ingenuity. Yet this machine itself was an invention, and, at the time it was introduced, one of great importance, for it supplanted the hand lathe; substituting the slide rest for the hand tool. Those who are familiar with the use of the latter implement will readily appreciate the introduction of the fixed rest. We can remember when large shafts, seven and eight inches in diameter, rough from the foundry pit or the trip hammer, were turned by hand, and sore work it was too, as aching limbs and chest could testify when the job was finished. Now all these things are among the by-gones. The iron turning lathe, as made to-day, seems one of the most complete tools conceivable; the compound slide rest, the universal chuck, the screw gearing for feed and cutting threads, the adjustable collars in the tool post, for regulating the height of the cutter, in short, the innumerable attachments which belong to it, characterize it as one of the first and most invaluable aids to mechanics. The uses to which it can be adapted are very many, and will suggest themselves to all persons familiar with a lathe.

We have said that it seemed almost perfect, yet every day some addition is made, or some modification carried out, which renders it still more complete and useful. In the lathe for turning wood, the general features for common work remain the same as in the one first constructed, but the adaptations of the machine for special purposes are something extraordinary. Automatic lathes, that execute forms of almost any kind, have been invented, and work with a certainty and precision that seems almost marvelous, did we not know that the inventor had conferred upon wood and iron mechanism some portion of his own vital genius.

The tools thus specified are but a few out of that vast number of willing slaves that crowd our factories and workshops; unto them is delegated the heat and burthen of the labor, while the human brain sits by and quietly directs the untiring energy of the machine upon whatever portion it wishes. Planing machines, whether for iron or wood, boring mills that turn the inside of our immense steam cylinders to a true circle, the multifarious combinations of inventions that are in daily use, have each and all of them lent their aid, in no small degree, to the civilization of mankind. From them comes increased comfort and luxury, and through their aid sufficient leisure is obtained by the great populations of all countries to improve their minds and to attain to still greater proficiency in the various trades. Nations circumscribed in their boundaries, and in geographical positions which are not favorable, have, through greater mental activity and by increased inventive talent, succeeded in not only maintaining their footing as Powers, but set an example of enterprise which it behooves all emulous of national distinction to follow.

SHARPSHOOTERS.

Captain Drew, of Vermont, well known to the people of that State, has issued a circular upon the subject of sharpshooters, in which he urges the importance of forming corps of those soldiers without delay. He says in brief:—

"I need not tell you of the almost incalculable advantage of this arm of the service, for it is written on every page that tells of battles lost or won. The rebels have made many thousands of sharpshooters—some of them are allowed to go to the field with their 'old familiar rifle,' and shoot when and where they please. The large proportion of officers killed on our side testifies to the great service these rebel marksmen do.

"Our Government is anxious to throw into the field more of this class of men. I have authority to raise, under the governor, five companies of one hundred men each. The governor does not think best that they should be called into camp until another call for troops shall have been made, but that we should find in each town a "noble few" who will pledge their honor to go as soon as more troops shall be called for. In this way we shall have a battalion ready, so that we have only to call for them, and at once from plow, workshop, store and school will come the noble defenders of our land. Your duties will be simple—"watch and kill." You will have no digging, no working; no "camp duty," no standing guard, but will be kept to the front on picket duty or sent forward as scouts and skirmishers. Come, then, sons of the North! your country needs your clear, keen eyes and steady hands; she needs your unflinching hearts and intelligent brains.

"All over the South, they have long been raising bands of sharpshooters and training them long before they are called for. In every town there are two or three young men who might pledge themselves to this, and then strive to see who is the best marksman. Without leaving your business you can become excellent sharpshooters by spending a few moments each day with your rifle or shot gun.

"Do not neglect to give this your attention and influence, for soon there will be another call for troops, and now is your time to prepare to avoid a draft and choose your situation yourself."

The text is pertinent to the occasion; not only in time of war but also in peace. It is singular that so few bodies of sharpshooters have been recruited during the war, considering the excellence of our people as marksmen. In most of the foreign countries, the use of the rifle is encouraged in all possible ways. Germany permits large bodies of her population to gather at certain periods of the year for target practice; these occasions are regular holidays in the nation's history, and are the scene of great festivity. In England there are national schools for the same purpose; the principal one is at Hythe, but in addition to this, there are numerous organizations of volunteer riflemen who are encouraged to put forth all their skill, and whatever talents they may possess in the use of this formidable weapon. Beyond a few turkey shootings or some unimportant meetings of a like nature, nothing is done to foster or develope the traditional skill of our woodsmen and settlers, which has been handed down from the earliest period of our history by all writers familiar with our early struggles. It would have been greatly to our advantage, if the reverse of this neglect had been observed. Cruel as it may seem, the fate of a battle depends in a great measure upon the life of its officers; not solely because it deprives the soldiers of moral support when they are killed, but on account of the confusion and loss of plans which their death necessarily entails. As the circular at the head of this article remarks, our loss of officers in late battles has been awfully disproportioned, and indeed entirely unprecedented; and it may be attributed wholly to the presence of sharpshooters, who, by the brilliant uniforms which our generals wore, were enabled to pick them off like so many partridges. It is, therefore, with the object in view of promoting efficiency in the use of the rifle, that we advocate the formation of such bodies of men without delay. Mechanics especially make excellent marksmen, on account of their superior education of their eyes and facility of estimating distances, and we can point with a pardonable pride to the feats and prowess performed during the war by the bone and sinew of the country. Let us then have more rifle practice; and if the fortunes of war compel us to shoot individuals, we can command as much success as our enemies in this respect.

Pennsylvania Cotton.

We have received a sample of cotton that was cultivated this season at Springhill Furnace, Fayette county, Pa., by Mr. John Oliphant. He states that he did not receive the seed for planting so early, by one month, as he desired; still he is satisfied from his experience that cotton can be cultivated successfully in Pennsylvania, and he is going to engage in its cultivation on a more extensive scale next year. The quality is short staple, and is of good strong fiber. The great draw-back to the successful cultivation of cotton in any of the Northern States will be our late and early frosts; still there are many situations, especially on plains, protected by hills from north winds, where it may be successfully grown in the southern parts of Pensylvania and New Jersey. We have also been informed that there is a species of cotton in China and Japan, cultivated in latitudes as high as that of New York city, and that it is used extensively in making both cloth and paper. The seed of such cotton should be imported and tried. Carolina cotton is an acclimated plant, not a native one.

Street Railroads in England.

Experience has demonstrated the benefits of street railroads in some of the provincial towns in England. The line at Birkenhead—the pioneer—has so grown into favor that its recent temporary stoppage was felt to be a public inconvenience, and a memorial was presented to the commissioners of the township, praying them to take steps to prevent the recurrence of such a misfortune. At the monthly meeting of the board, on the 10th of October, it was announced that this would be sought to be effected by obtaining a bill from Parliament to legalize the original permission given to lay down the rails, and to confer powers of controlling the working of the line upon the commissioners. At present it is open to any ill-natured person to stop the street railway by indicting it in the Court of Chancery as a nuisance.

Foreign Honors to an American.—Mr. John E. Gowan, who raised the Russian ships sunk at Sebastopol, has been decorated by the Emperor of Russia with the cross of the order of Saint Vladimir. Victor Emmanuel, King of Italy, has decorated him with the Cross of the Order of Saints Maurice and Lazzaro, and the Sultan of Turkey has conferred upon him the Imperial Decoration of the Medijash. The last two were bestowed in recognition of Mr. Gowan's services in repairing and protecting the cemeteries of the allied forces in the Crimea.

RECENT FOREIGN INVENTIONS.

Coating Iron to Preserve it from Rust, &c.—G. Bennett, of London, has applied for a patent to protect iron by treating it as follows:—It is first scoured bright by steeping it for six hours in dilute sulphuric acid, at the rate of 1 pound of acid to 10 gallons of cold water, after which it is rubbed with sand and emery and washed well in warm soft water; then it is heated to 212° in a stove and is ready for the coating. This consists of a paste composed of 28 pounds of flint and 14 pounds of borax, pulverized and fused together, then ground with water and 5 pounds of potter's clay. It is put on the iron like paint in a coat of about one-tenth of an inch in thickness and allowed to become half dry; then it is dusted over with a powder composed of 62 pounds of white glass, 12 pounds of borax and 10 pounds of soda, fused first then ground with water and dried in a kiln. The iron thus coated and dusted over is dried in a stove at a heat of 212°; then placed in a potter's kiln and submitted to a heat which fuses it and forms an enamel on the surface of the metal. It is afterward cooled slowly to anneal it.

Molded Articles of Ivory and Bone.—L. Gabler and M. Zingler, of England, have applied for a patent to make ornamental articles as follows:—Ivory or bone are first reduced to fine powder, then mixed with a cementing solution of gelatine or gum ammoniacal, and formed into a doughy paste; then forced into molds of the form required to produce the molded articles. A considerable pressure is employed to mold this ivory cement, and the molds are so formed as to permit the escape of air and moisture. After the articles have become set in the molds, they are removed, placed on shelves and soon become as hard as ivory and resemble it in appearance. Coloring pigments may be mixed with the cement to impart any desired hue to the articles.

Stoneware Pulleys.—A patent has been taken out by W. McAdam, of Scotland, for making pulleys of stoneware; also the weights for window sashes. Under one modification of the patent, the frame in which the pulleys of window sashes are fixed, is stated to be formed of stoneware molded to suit the window. The sheaves or pulleys are molded of porcelain clay, and burned in a kiln in the usual manner. The sash weights are molded hollow of clay and burned like the pulleys, and the proper weight to balance the sash is obtained by filling the inside with a quantity of metallic dust.

Sugar-refining Pans.—In place of using the ordinary stationary vacuum pans for refining sugar, J. Robey, of London, has patented for the same purpose a rotating pan of a cylindrical shape with hemispherical ends. The saccharine fluid occupies but a small portion of the interior space. By the rotary motion given to the pan and its extensive heating surface, a more rapid evaporation of the fluid is said to be secured than by the ordinary pan.

Caustic Soda and Potash.—A patent has been obtained by W. Gossage, of London, chemist, for manufacturing caustic soda and potash, by causing the common carbonate of soda (soda ash of commerce) or carbonate of potash in a state of solution to filter through slaked lime. The carbonic acid in the crude soda and potash combine with the lime forming carbonate of lime (chalk) and the filtered solution is thus rendered caustic. Caustic soda is now used extensively in the purification of petroleum.

Preventing Corrosion of Steam Boilers.—T. Davidson, of Belfast, Ireland, has taken out a patent for the use of soda in such steam boilers as belong to engines that are furnished with surface condensers, and in which the same water is used over and over again. It is stated that such water corrodes boilers rapidly, and the object of this invention is to prevent such action. A sufficient quantity of the carbonate of soda to render the water slightly alkaline, it is stated, will effect the object desired.

Cotton Duck.—At the present price of cotton duck, a suit of sails for a ship of 1,000 tuns would cost not less than $5,500, not including bolt-rope manufacture, &c., reckoning 7,500 yards for the suit, at an average price of 75c. per yard. For a ship of 1,000 tuns, No. 3 duck is used, which weighs one pound to the yard, a fact that will give some adequate idea of the amount of cotton used, as well as the weight of a suit of sails.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Bed Vapor Bath.—The object obtained by this invention is two-fold, viz., first, to enable a vapor bath to be administered in a bed without changing the position of a sick patient; and, second, to obtain an apparatus for administering such a bath, so inexpensive as to bring it within the reach of nearly all classes and which enables the bath to be taken as a luxury without the aid of a second person. The invention consists in an apparatus composed of a boiler and lamp inclosed within a suitable casing to which the boiler is fitted in such a manner as to provide for the escape of the vapor through a suitable perforated or reticulated medium, the whole being placed upon a suitable base in which are provided suitable supports for the upper bed-clothes, so that when the apparatus is placed in a bed between the mattress and the upper clothes or covering, they may be kept out of contact with the patient, and also prevented from interfering with the evaporation or the elimination of the vapors; the casing is furnished with suitable means of confining the said clothes or covering to its sides to make it form, in combination with the mattress, a vapor bath of convenient form and size. This valuable invention was patented by Miss Sarah E. Payson, who may be addressed, in care of Geo. A. Payson, Milton, Mass.

Evaporating Cane Juice.—The object of this invention is so to employ steam as the heating medium in the evaporation of cane juice and other saccharine solutions as to provide for the tempering and uniform regulation of the heat. For this purpose an inner and an outer vessel are employed, the inner vessel containing the juice and having within it a series of rotating disks which take up the juice and expose it to the atmosphere, and the steam being admitted to the space between the two vessels. This invention consists in so applying a perforated coil of steam pipe for the admission of the steam into the said space, in combination with a cold-water injection pipe and overflow, for the circulation of water through the vessel, that the steam is delivered into the said space without passing through the water; but the steam pipe is so far immersed in the water as to enable the steam to be more or less tempered by regulating the circulation. The patentee of this invention is James Newnam, of London, England.

Evaporator for Saccharine Liquids.—This invention consists in conducting the smoke pipe through the heater in such a manner that the contents of the heater are heated by the action of the gases and products of combustion passing from the fire through the smoke pipe; it consists, further, in the arrangement of a spiral channel at the bottom of the heater, and passing around the smoke-pipe in such a manner that the liquid has to pass several times around the smoke-pipe, whereby it becomes highly heated before it is permitted to escape from the heater. It consists also in the arrangement of a helical inclined channel receiving the liquid to be evaporated in its middle or highest part, and discharging it at the circumference or at its lowest part, in such a manner that the liquid, in passing from the highest to the lowest point of the helical channel, is spread in a thin sheet over a large heated surface, and the evaporation is accomplished in a short time and with little labor and with a comparatively small expenditure of fuel. It consists, finally, in the arrangement of a heater provided with a regulating faucet in combination with the helical evaporator, in such a manner that the discharge of the liquid from the heater can be regulated according to the temperature of the helical channel, and according to the desired degree of evaporation. James C. McKee, of Urbana, Ill., is the inventor of this improvement.

Printing Press.—This invention relates to an improved printing press of that class commonly termed power presses, and which are designed for rapid work. The object of the invention is to obtain a printing press of the class specified, by which both sides of the sheet may be printed in passing once through the press and the parts so arranged that the press may be fed at both ends, so as to render the printing operation continuous, the printed sheets being also discharged from both ends of the machine. The invention consists substantially in the employment of a cylinder having a form fitted in its periphery, and so operated as to have a reciprocating partially rotating movement, and working in connection with a reciprocating bed which receives the sheets, and upon which the sheets receive the impression from the form cylinder. The above parts are used in combination with a reciprocating form bed and pressure rollers, all arranged in such a manner as to effect the desired end. The inventor of this press is James Gordon, of Caledonia, N. Y.

Revolving Fire-arm.—On the 22d of July, 1856, C. S. Pettengill obtained Letters Patent for the invention of certain improvements in revolving fire-arms, and on the 27th of July, 1858, E. A. Raymond and C. Robitaille obtained Letters Patent for the invention of certain improvements on the aforesaid inventions of C. S. Pettengill. In fire-arms constructed according to either of these inventions, the necessary tension is brought upon the mainspring to produce the blow of the hammer by the force applied to the trigger in the act of drawing it to fire, through the agency of a lever operated upon by a cam on the trigger. Owing to the manner in which the force is transmitted by the aforesaid cam, the pull on the trigger requires to be harder as the tension of the spring increases. The principal object of this invention is to overcome this difficulty and to obtain a constantly increasing application of power upon the lever, to counterbalance the increasing tension of the spring, without requiring a corresponding increase in the force applied to the trigger. To this end it consists in effecting the connection between the trigger and lever by means of a toggle arranged and applied as specified. H. S. Rogers, of Willow Vale, N. Y., is the inventor of this improvement.

PATENT BUSINESS IN 1860 and 1862.

During the first nine months (from January to October) of 1860 there were three thousand nine hundred and thirteen patents issued from the United States Patent Office. For the same period this year there have been granted only eighteen hundred and eighty-five patents; thus showing a decrease in the number of patents issued up to October 1st. of considerably more than one-half of the number issued in the same period in 1860. This falling-off does not augur well for the prosperity of the country. Labor-saving machinery was never in greater demand than now, but where are the inventors? Certainly half of them cannot have gone to the war.

Three Millions of Bullion per Month.

The Territory of Nevada, that great and wealthy gold and silver spot, scarcely marked on the geographical maps of Europe, will furnish no less than $3,000,000 in silver and gold per month shortly. From the number of companies and associations recently formed in this State and Nevada Territory, the amount of bullion must be materially augmented—a great amount of capital will be invested, and the miners, and the working classes generally, can find no better field than this new Territory. Humboldt district is coming out finely, and bids fair to exceed even the section known as Washoe. But bullion of any amount has not yet been received from that quarter. Esmeralda interests seem to revive with celerity.—*Cal. Alta. Press.*

A Scientific Problem—Oblique Arches.

At the late meeting of the Holland Society of Science, which assembles annually at Harlem, it was stated that since the establishment of railroads, the construction of oblique arches had much increased, while the rules for fixing the dimensions of these arches and of their parts have not yet reached the degree of perfection arrived at in relation to other arches. The Society consequently calls for a mathematical theory of oblique arches, whence rules may be deducted for the form and dimensions of these arches, for their slopes, and especially for the limit of the inclination allowable to such works.

Since the beginning of the war New York has raised an aggregate force of two hundred and nineteen thousand and fifty-nine men, of which 188,070 are infantry, 9,679 artillery, 9,642 cavalry, 855 engineers, 168 rocket battalion, and 10,650 recruits raised and being organized in the State.

A Visit to Robinson Crusoe's Island.

The following interesting information is derived from the San Francisco *Times*:—While the ship *Golden Rocket* was on her last passage from Boston to San Francisco, Capt. Pendleton determined to stop at the island of San Juan Fernandez, to take in water. On the 24th of March he arrived in the bay of St. Joseph and anchored on the opposite side from that on which Robinson Crusoe (Alexander Selkirk the exile Scotchman) lived. The casks were taken on shore, and while the crew were at work, the passengers, among whom were fifty ladies, rambled about in different directions. The island is twenty-five miles long by about four in breadth. The land is very high, rising in rugged, precipitous peaks; one of them called Tunkcue, 3,500 feet above the level of the sea. The peaks are generally overhung with clouds. The valleys are exceeding fertile, the grass growing to the hight of six or eight feet. Figs, strawberries, peaches and cherries abound in their season. The *Golden Rocket* was there in the season of peaches, and the valleys and hillsides were full of trees loaded down with delicious fruit. Strawberries flourish best in December and January. There are three remarkable caves in the sides of the hill facing the harbor, about thirty feet in length, twenty-five in width and about the same in hight. The inhabitants now number but fourteen, of whom Messrs. Day and Kirkaldie, from Valparaiso, are the chief persons; they have been appointed overseers of the island by the Chilian Government. An immense number of goats are running wild over the island, and an abundance of fish are taken on the coast.

Sea Sickness.

A late number of *Silliman's Journal* contains a paper by R. M. Bache, of the United States Coast Survey, on the "Physiology of Sea Sickness." Prof. Bache asserts the theory that this distressing malady is not a disease of the stomach, but of the brain, and arises from the fact of the mind not being able to understand the varying motions of the ship as rapidly as the senses feel them, thus causing a conflict of impression and a consequent affection of the brain, which in turn deranges the nervous system and produces nausea. The smell of food, close air, and similar matters may aggravate the disease, but are not the primary cause of it. As soon as the mind is educated up to a point that enables it to conceive the idea of each motion as soon as it is felt, sea sickness ceases. Prof. Bache recommends persons going on board a vessel to eat an ordinary meal, and while there to conform as closely as possible to their habits while on land. The deck is the best place to remain during sea sickness, as the sight can there be best educated to the movements, and the fresh air has a good effect. A steady gaze at the horizon enables the sufferer to quickly estimate the movements of the ship. If possible, chose a position amidships, on deck, spread a mattress, lie down and look at the horizon, and then all has been done that can be done to prevent sea sickness. With all possible deference to Prof. Bache's opinion, we would like to ask how it is that old captains and sailors who have followed the sea for years get deadly sick at times in a storm?

Oil for Chronometers.

Professor Airy has recently made an interesting report to the British Government, involving the results of his examination of various chronometers. Professor Airy says that the material and workmanship of all the chronometers are very good, there being amongst nearly all of them but very little difference in this respect; and, in uniform circumstances of temperature, every one of the chronometers would go almost as well as an astronomical clock. The great cause of failure is the want of compensation or the too great compensation for the effects of temperature. Another very serious cause of error has its source in the oil, which is injured by heat This is very different in different cases. Thus the oil employed by one chronometer maker was not at all injured by heat; while some of that used by another chronometer maker was found to be so bad that, after going through the same heating as that of the first-mentioned maker, the rates of the chronometers were changed, on returning to ordinary temperature, by eighty seconds per week.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING NOVEMBER 4, 1862.

Reported Officially for the Scientific American.

. Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

36,827.—Lambert Andrews, of Plantsville, Conn., for Improvement in Mole Traps:

I claim as an improved mode of constructing and using mole traps, viz: The combination of the plate, e, pins, f, (arranged at each end of said plate, e), and the box, a, (with proper spring device), when placed in the ground as described, and the parts arranged and operating substantially in the manner and for the purpose described.

36,828.—S. G. Barker, of Carbondale, Pa., for Improvement in Scale Beams:

I claim making the suspension point, c, adjustable upon the beam, A, by means of the slide, B, in combination with the threaded stem, h, jam nuts, i i, boss, k, and thumb screw, m, the same being arranged to operate substantially in the manner described, for the purposes specified.

36,829.—R. Boeklen, of Brooklyn, N. Y., and G. W. Schramm, of New York City, for Improvement in Hammers:

We claim the construction of a hammer head, with a face at each end and a claw on one side, substantially as and for the purpose herein specified.

36,830.—J. L. Booth, of Rochester, N. Y., for Improvement in Grain Separators:

I claim the above-described apparatus, composed of the frame, A, provided with hopper, E, screens, C, the standards, B B B, and spurs, i i i, so arranged that it may be secured to the floor at any place, in the manner shown, and operating by vibrations, substantially as herein set forth.

36,831.—William Bourn, of Geneva, N. Y., for Improved Boot-jack:

I claim the combination of the side pieces, A A, double-acting wedge, B, and bolt, C, arranged in such a manner that the wedge forms a bearing the whole length between the said side pieces, and operates the jaws automatically by the weight of the operator, substantially as herein set forth.

36,832.—Adolph Brown and Felix Brown, of New York City, for Improvement in Friction Couplings:

We claim the herein-described friction coupling, constructed and operating in the manner and for the purpose substantially as specified and set forth.

36,833.—A. B. Corey, of Sprague, Conn., for Improvement in Machinery in Dressing and Sizing Warps:

I claim the arrangement and combination of the evener with other warp-dressing machinery, substantially as described.

36,834.—Joseph Evans, of Newark, N. J., for Improvement in Fruit Gatherers:

I claim attaching and detaching the conveyer, K, to and from the jaw levers, by means of the curved spring wires or rods, I I, and lateral eyes, i i, the whole arranged, combined and operating, substantially as and for the purpose herein set forth.

I also claim the circular arrangement of the whole instrument, consisting essentially of the cross levers, B B, connecting bars, D D, sliding rod, E, guide collar, G, pole, A, with the cylindrical end, H, and detachable conveyer, K, substantially as herein described.

I also claim the vertical separating wires, d d, of the jaws, for properly guiding the twigs to the knives in pruning, in combination with the knives, L L, at the top of the jaws, arranged and operating substantially as herein described.

36,835.—Francis Gardner, of Roxbury, Mass., for Improved Canteen:

I claim the within-described canteen, with its various compartments, removable drinking tube and filter, constructed and arranged as described.

36,836.—R. J. Gatling, of Indianapolis, Ind., for Improvement in Revolving Battery Guns:

I claim, first, The combination of the lock cylinder or breech, D, with the grooved carrier, C, circular plate, F, and barrels, E E, &c. The lock-cylinder or breech carrier, and circular plate, being firmly fastened upon the main shaft, N, and the locks, grooves in the carrier, and barrels, being arranged on a line parallel with the axis of revolution. The whole revolving together when the gun is in operation, substantially as described.

Second, I claim the use of as many locks as there are barrels, said locks revolving simultaneously with the breech and barrels, and being arranged and operated substantially as set forth.

Third, I claim the stationary ring, P, provided with inclined planes on its inner edge, in combination with lock-cylinder, D, and locks, when constructed and operated for the purposes substantially as set forth.

Fourth, I claim the tubes, a a, &c., furnished with the flanged breech pins, c c &c., and springs, e e, &c., and which contain the lock hammers, b b, &c., and mainsprings, d d, &c., in combination with the revolving breech, D, disc, I, and sweil, O, when constructed, arranged and operated, for the purposes substantially as set forth.

Fifth, I claim the disc, I, in combination with the external breech piece or casing, A, which forms a shield or covering for the lock cylinder, and which protects the locks and cog wheels from injury.

36,837.—H. C. Hunt and G. W. Devin, of Ottumwa, Iowa, for Improvement in Pumps:

The stationary semi-cylindrical case, B, provided with the slide valve, D, abutment or partition, a, and induction openings, c c, with the eduction pipe, C, placed between them, in combination with the oscillating plate, F, having the pistons, E E', attached and placed respectively in the compartments, b b', and provided with the arms, g g, which are connected to a suitable lever, G, all arranged to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a force pump which will be simple in construction, capable of being operated with but a small expenditure of power, and of being manufactured at a reasonable cost, and not liable to get out of repair and become deranged by use.]

36,838.—L. F. Hall, of Fonda, N. Y., for Improvement in Shawl Pins:

I claim a shawl pin constructed of a single piece of wire, bent so as to form two parallel prongs, a a, provided with hooks, b b, at one end, and a hook, c, at the opposite end, as herein shown and described.

[The object of this invention is to obtain a shawl pin of simple construction which may be constructed at a small cost, be readily applied to the shawl for securing it on the person, and when thus applied not capable of being casually detached.]

36,839.—James Gordon, of Caledonia, N. Y., for Improved Printing Press:

I claim, first, A partially-rotating cylinder, B, provided with a type form, F, and operating in connection with a reciprocating bed, G', which holds or retains the sheets, while they are receiving the impression from the form, F, on cylinder, B, in combination with the reciprocating form bed, S, and pressure rollers, Q Q, all arranged as shown, and in connection with conveying tapes, to operate as and for the purpose herein set forth.

Second, The manner of adjusting, or raising and lowering the rollers, Q Q, as shown and described, to wit, by means of the pitmen, c^s, attached to the bearings, R, and to cranks, b^w, on shafts, a^s a^s, which are connected by a bar, d^s, secured to the ends of arms, c^s, which project from said shafts, and one of the latter having a forked arm, g^s, attached to it, in which an eccentric, f^s, on shaft, F, works.

36,840.—G. P. Gordon, of Brooklyn, N. Y., for Improvement in Printing Presses:

First, I claim a platen which shall be stationary for the reception of the sheet and for the reception of the impression, a, when such platen shall be vibrated for the purpose set forth; b, when such platen shall be placed at an angle from the horizontal or vertical position, in order that the printed sheet may be readily delivered by the rolling tympan sheet and sheet-taking nippers, as shown; c, when such platen shall be combined with the sheet-taking nippers, held and carried, substantially as described; d, when such platen shall be combined with the rocking nipper arms, and the rolling tympan operating substantially as described, for the purposes fully described.

Second, I claim the sheet-taking nippers, a, when held and carried by the rocking arms in combination with a stationary feed-table, as shown, for the purpose set forth; b, when such sheet-taking nippers shall be swiveled and hung upon a rod, so that they must move in any direction in which the rod may be turned, and yet, at the same time, allow the jaws of such nippers to have an independent movement to and from each other, to take and deliver a sheet; c, when said sheet-taking nippers shall be operated as shown, for the purpose specified; d, when said sheet-taking nippers, holding the sheet and resting upon the platen, shall vibrate with the platen for the purpose shown.

Third, I claim the sheet-guide or shield, a, when such sheet-guide or shield shall be used in combination with the rocking nipper arms and the rolling tympan, operating substantially as shown; b, when such sheet-guide or shield shall be used in combination with the pile table, for the purpose fully shown.

Fourth, I claim, for the purpose of giving a more thorough distribution and for supplying ink to the inking rollers, a revolving tabular distribution surface upon one side of the form, and a revolving-cylindrical distribution surface upon the other side of the form, as herein fully shown.

Fifth, Detaching, and thereby suspending the operation of the nippers, nipper arms and rolling tympan, for the purpose specified.

Sixth, I claim the sheet catches or holders, K K; a, when such sheet catches or holders shall be combined with the pile table, for the purpose described; b, when such sheet catches or holders shall be combined with the sheet-guide or shield, for the purpose shown.

Seventh, I claim projecting the stationary feed table over and beyond the face line of the platen, for the purpose specified.

Eighth, I claim the sheet gages, constructed substantially as described, in combination with a stationary feed table, for the purpose set forth.

36,841.—J. H. Irwin, of Chicago, Ill., for Improvement in Lanterns:

I claim the combination of the two flanges, b c, and plates, d, with the lamp, E, jacket, G, and lantern, A, in the manner herein shown and described.

I also claim having the cap, H, arranged below the upper extremities of the wick tubes, as herein shown and described.

[The object of this invention is to obtain a burner for lanterns which will admit of coal oil and other similar hydro-carbons being used as a burning material without the usual draught-chimney, and without the liability of the flame being extinguished by the swinging of the lantern or an up-and-down movement of the same, and also without the liability of the oil being unduly heated and vaporized so as to cause an explosion of the lamp.]

36,842.—Gamaliel Jackson, of Cincinnati, Ohio, for Improved Watchmakers' Lathe:

I claim, first, The arrangement of grasping apparatus on parallel adjustable rods, l l, in such a manner that the piece to be turned may be grasped at any part, one end of it resting in a stationary center.

Second, The application of ball-and-socket motion to the head of a lathe, in such a manner that one end of a piece of work may be adjusted, while the other end rests in a stationary center, constructed and operating as herein set forth.

36,843.—Samuel Johnston, of Buffalo, N. Y., for Improvement in Harvesters:

I claim, first, The arrangement and combination in a reaper and mower of the hanger, I, curved guide, O, hinge joints, M and g, and shield, P', of shoe, P, or their equivalents, constructed and operating substantially in the manner and for the purpose described.

Second, Constructing and arranging the bearing, n m, substantially in the manner described, in combination with the pitman shaft, J, shield, P', and hinge joints, M and G, for the purpose set forth.

Third, The hanger, I I' I 2 I 3 h h', constructed as described.

Fourth, Arranging the automatic rake attachment upon the inner end of the finger beam, by means and in the manner substantially as described and for the purpose set forth.

Fifth, The combination of the cam track, partly inclosed by rails, t t', and a yielding gate, t2, with the guiding eye, R2, lever, Z, crane-like arm, U V, pivoted rake head, X, and stale, Y, substantially as and for the purposes described.

Sixth, The construction of the jointed crane-like arm, U V, substantially as and for the purpose set forth.

Seventh, The construction of the part, V, of the arm with journals, and with points of attachment for the lever, Z, and part, U, of the arm, substantially in the manner described.

Eighth, The combination of the yielding gate, t2, and the rails, t t', of the grooved or cam track, W, substantially as and for the purpose described.

Ninth, The bearing, W, with a groove and rails, t t' t2, constructed and operating as described, in combination with the extension, S S', of the part, U, of the crane-like arm, for the purpose set forth.

Tenth, The construction and arrangement of the pivoted spring gate at the end of the horizontal groove or cam track, substantially as and for the purpose set forth.

Eleventh, The combination, in an automatic hand-rake attachment, of the eye, R2, and the stale, Y, for the purpose set forth.

Twelfth, The construction and arrangement of the open-slotted adjustable pole plate, N p, as described and for the purpose set forth.

36,844.—T. J. McGowan, of Cincinnati, Ohio, for Improvement in Pumps:

I claim providing the pump bucket, D, or any suitable part connected therewith, and the lower valve guard, I, or any part attached to it with screws, or their equivalents, arranged in such a manner that all the working parts of the pump may, by a simple manipulation, be connected together, and simultaneously withdrawn from the pump cylinder, A, and also adjusted therein, substantially as and for the purpose herein specified.

[This invention relates to an improvement in the ordinary reciprocating pump, and consists in constructing and arranging the working parts thereof, namely, the bucket, valves and lower valve seat, in such a manner that they may all, when necessary, be readily withdrawn from the pump cylinder at one operation or simultaneously, without disturbing or moving the pump cylinder, thereby rendering the labor of repairing comparatively light and inexpensive.]

36,845.—Isaac A. Ketcham, of Brooklyn, N. Y., for Improved Mode of Operating Submarine or Floating Batteries:

I claim the combination of a battery or connected series of explosive shells, D, and endless cable, B, for confining and adjusting them in position, and a buoyant attachment, F G, for effecting their explosion by the action of a passing vessel with the buoyant indicator, H, the whole being constructed and arranged to operate in the manner and for the purposes specified.

[The subject of this invention is a device by means of which a submerged battery or any number of explosive shells may be advanced from a vessel or fortification and adjusted to a suitable position to be exploded at the time of the passage of an enemy's ship, either by the motion of the said ship or by means of a connection with the vessel or fortification from which the battery is thrown out.]

36,846.—T. J. Kindleberger, of Springfield, Ohio, for Improvement in Water Wheels:

I claim, first, The wheel, B, placed within the cylinder, A, and composed of a plurality of parts, a a' a'', three, more or less, provided with buckets, D, formed of an inner tangential and inclined portion, c, and a horizontal and radial outer portion, d, in connection with the chutes, F, and cylindrical gate, G, all arranged substantially as and for the purpose specified.

Second, The arms g, connected to the gate by rods, f, said arms

resting or bearing on the curved inclined ways, j, on the top of the cylinder, A, and the arms, g, turned upon the inclined ways, j, by means of the arm, m, attached to the shaft, n, and link, l, substantially as described.

[This invention relates to an improved horizontal water wheel of that class in which the water is discharged at the center, generally termed center-vent wheels. The invention consists in the employment of a plurality of wheels placed one over the other on the same shaft and provided with buckets, the outer portions of which have a radial position in the wheel, and the other portion an oblique or tangential and inclined position. The wheels are placed within a cylinder provided with chutes, and a cylindrical gate is placed between the chutes and the wheels, all being arranged in such a manner that a large percentage of the power of the water is obtained when the wheel is working at its maximum, and less power obtained than the maximum, when required, without extending any more than a corresponding decrease of water.]

36,847.—S. J. Maddock, of Cincinnati, Ohio, for Improvement in Braiding Guides for Sewing Machines:

I claim a braid guide for sewing machines, composed of an adjustable double gage, F, and a plate, A a, having an attached arm, B; all constructed and operating together as herein shown and described for the purpose set forth.

[This invention consists in a guide adapted to the sewing on of braid or other fabric of similar character, its principal feature being a flat double gage, through which the braid or other material passes, and which is adjustable for different widths of braid.]

36,848.—Samuel Johnston, of Buffalo, N. Y., for Improvement in Corn Harvesters:

I claim, first, The combination of the two gatherers, constructed as described, with the cutting apparatus and the receiver, with inclined sides, substantially as and for the purpose set forth.

Second, The construction and arrangement of the two inclined oblique wings of a corn harvester, as herein described.

Third, Imparting a swinging outward and upward movement to the movable section of the receiver as it opens to discharge the corn, and a swinging upward and inward motion thereto as it closes, substantially as set forth.

Fourth, The special means set forth for producing said motions of the movable section of the receiver.

Fifth, In the organization of a corn harvester, substantially as described, to be operated by the gearing of a grain harvester machine, I claim extending the finger beam and knife rod, without guard fingers or knives on the extended portion, beyond the inner wing of the corn harvester, so that it may be practically attached to the supporting and driving mechanism of the grain harvester frame, and when thus attached its finger beam and knife rod shall be sustained by the inner shoe of the grain harvester, and its mechanism for operating the movable section of the corn receiver shall be in position to be operated by the driver, substantially as herein described.

36,849.—J. C. McKee, of Urbana, Ill., for Improved Evaporator for Saccharine Liquids:

I claim, first, The evaporator, F, constructed with a helical inclined channel in combination with the furnace, A, constructed and operating substantially in the manner and for the purpose herein set forth.

Second, The arrangement and combination of the heater, E, smoke pipe, D, regulating faucet, d', helical inclined channel, d, and furnace, A, all constructed and operating substantially as and for the purpose described.

36,850.—S. M. Moore, of Beloit, Wis., for Improvement in Mowing Machines:

I claim the combination of the main frame driving wheel, driver's seat finger beam, drag shoes and lifting lever, when arranged for joint operation, substantially as described and for the purposes set forth.

I also claim the combination of the finger beam with the shoes or runners, E F and G, having great rear projection, when arranged and operating as and for the purpose described.

36,851.—James Newnam, of London, England, for Improved Evaporator for Saccharine Juices:

I claim so applying a perforated steam pipe, E, or its equivalent within the space between the vessels, A B, and in combination with the cold water injection, H, and overflow, I, that the steam is delivered into the full space without entering the water, and is tempered by the circulation of water, substantially as and for the purpose herein specified.

36,852.—J. C. Nye, of Cincinnati, Ohio, for Improvement in Breech-loading Fire-arms:

I claim the key or gate, C, and the mode of applying the same to fire-arms, substantially as described.

36,853.—T. G. Otterson, of Millville, N. J., for Improved Fruit Jar:

In combination with a glass jar, having a rabbet around the top or mouth on the outside, I claim a glass cover shutting over on to the rabbet or the packing on the rabbet, substantially as described.

36,854.—Joseph Reckendorfer, of New York City, for Improvement in Pencils:

I claim the wooden case, A, of tapering form, in combination with the rubber, C, of larger section, and the black-lead, B, of smaller section, arranged therein, substantially as and for the purpose herein described.

36,855.—W. M. Phelps, of Marshall, Mich., for Improvement, in Connecting Sheet-metal for Eaves Troughs. Ante-dated June 13, 1862:

I claim the mode of uniting the separate sheets of metal, of which eaves troughs are composed, by the use of the locked seam, E, in combination with the lapped seam, c, of a stiffening bead, B, substantially as and for the purposes specified.

36,856.—Sarah E. Payson, of Peterborough, N. H., for Improvement in Vapor Baths:

I claim, first, The combination of a boiler, a lamp, a surrounding and supporting casing, a suitable base, and standards, D D, for the support of the upper bed-clothes or covering, substantially as and for the purpose herein specified.

Second, The combination with the boiler, lamp, casing and standards, of bars, H H, attached to the sides of the casing, substantially as and for the purpose herein set forth.

36,857.—George Richardson, of Springfield, Mass., for Improvement in Balance Slide Valves:

I claim, first, The combination of the valve, H, wedges, F and G, and steam chest cover, E, when severally constructed and operating substantially in the manner and for the purpose herein set forth.

Second, The combination of the sliding valve, H, having the ports, I m, situated as herein described, with the recesses, l and k, in an adjustable piece, G, when operating substantially in the manner and for the purpose herein set forth.

36,858.—W. F. Rippon, of Providence, R. I., for Improvement in Explosive Projectiles for Ordnance:

I claim the combination of the mortar tube, E, central tube, F, plate, D, and plug, E, with the shell, A, and the openings therein, a a, in the manner and for the purpose herein shown and described.

Having the tube, F, provided with a spiral fuse groove, d, so arranged as to conduct the fire from chamber, a, between the tubes, F B, successively across the vents, b b b b, of the mortars to the powder chamber, G, and the interior of tube, F, as and for the purpose herein shown and described.

The combination of the partition, I, with the mortar tube, B, and the shell, A, thereby forming a ballast chamber, H, all as herein shown and described.

[This invention relates to elongated projectiles in which are provided radial chambers or mortars from which smaller projectiles are to be discharged either during the flight of or after the striking of the first one, and it consists in a certain construction of the internal parts of such projectiles, whereby greater destructiveness is obtained. An illustration of this invention appeared on page 354, Vol. VI., of the SCIENTIFIC AMERICAN.]

36,859.—Cyrus Roberts, of Three Rivers, Mich., for Improvement in Cultivators:

I claim, first, Mounting the front feet in a frame having both a lateral and a vertical movement when arranged and operating substantially in the manner and for the purpose described.

Second, The combination of the front and rear lifting frames, to which the respective rows of teeth are attached, with a hand lever, substantially in the manner described for the purpose set forth.

Third, The combination of the stay-chains with the frame and feet, when arranged in relation to the joints of the lifting frames, in the manner and for the purpose specified.

Fourth, The combination of the tongue, driver's seat, and front and rear lifting frames, when arranged in relation to the wheels, substantially as herein described, for the purpose of balancing the machine, as set forth.

36,860.—I. D. Robinson, of Waterbury, Vt., for Improved Clothes-wringing Machine:

I claim the combination and arrangement of the lever, A, the spring, B, the screw, C, the rod, E, the leg, N, the semi-circular projection, k, and the rubber spring, H, constructed substantially as and for the purpose specified.

36,861.—H. S. Rogers, of Willow Vale, N. Y., for Improvement in Revolving Fire-arms:

I claim combining the trigger with the lever, A, by means of a toggle, E' F', applied and arranged to operate substantially as herein specified.

36,862.—William Sewell, of New York City, for Improvement in Steam Pumps:

I claim the combined arrangement of the crank shaft, crank or cranks, cross-head and connecting rod or rods, substantially as and for the purpose herein specified.

[The object of this invention is to combine a crank and a fly-wheel with a direct-connection steam pump in a very simple manner and without materially increasing the room occupied; and it consists in a novel arrangement of the crank shaft, crank or cranks, cross-head and connecting rod or rods, whereby these results are obtained. We shall publish an illustration and description of this invention in a week or two.

36,863.—William Sewell, of New York City, for Improvement in Valves for Steam Pumps:

I claim, first, So constructing and applying the valve that its flexible portion or hinge is held at a point or in a line outside of the chamber which contains the valve, substantially as and for the purpose herein specified.

Second, The combination of the block, D, provided with dowels, d d, or their equivalents, the finger, c, and the cap, E, the whole applied in combination with the valve, C, and the opening, b, in the valve chamber, substantially as and for the purpose herein set forth.

[This invention relates to valves composed wholly or in part of india rubber or other flexible material; it consists in a novel construction and mode of applying and securing such valves, which afford great facility for taking them out and replacing them, and which permit them to open to a nearly equal width all around their seats. This invention will soon be illustrated in our paper by suitable engravings.]

36,864.—A. W. Smith, of Manchester, N. H., for Improvement in Fliers for Spinning:

I claim, first, The construction of a presser for head bobbins, by combining the spiral spring, a, the arm, b, and the hook, c, of one and the same piece of steel wire formed and arranged, substantially as described, for the purposes herein set forth.

Second, I also claim the combination of the arm, spring and hook, whether in one or more pieces, when so arranged as to give the hook, or delivering finger, the vertical play necessary to lay the yarn close to the pipper and lower heads of the bobbin, as set forth.

30,865.—Joel Smith, Jr., of Allegheny City, Pa., for Improvement in Hinges for Shutters:

I claim the arrangement of the cam, g, and eccentric lever, f, when used in combination with the hinge arranged, constructed and operated substantially as herein described and for the purpose set forth.

36,866.—J. J. Starr, of Cincinnati, Ohio, for Improved Ice Clog:

I claim, as an improved article of manufacture, the ice clog composed of the roughened plate, A, having oblique lips, B B', adapted to embrace the shoe sole just behind its widest part, and to receive straps, D D', which fasten over the instep, the whole being constructed and operating as described.

36,867.—J. M. H. A. Taurines, of Paris, France, for Improvement in Spring Balances:

I claim, first, The arrangement and method of constructing balance and weigh-bridges with elastic or spring-like connections, substantially in manner hereinbefore described and illustrated in the accompanying drawings.

Second, The employment of suspension springs in pairs, in manner and for the purposes herein before described and illustrated in the accompanying drawings.

Third, The employment of central springs, H, for the purpose of enabling the platform to be loaded at any part for increasing the strength and acting as a regulator, all as hereinbefore described and illustrated in the accompanying drawings.

Fourth, The employment of a lever, F, the end of which is free to move in a vertical direction, substantially in manner and for the purposes hereinbefore decribed and illustrated in the accompanying drawings.

36,868.—E. A. Stevens, of Hoboken, N. J., for Improved Means of Protecting War Vessels:

I claim the use of a sheathing of gum-elastic or equivalent material, applied internally or externally to the side, top or bottom of a chamber or vessel containing water to be used for immersing ships, or as a protection against projectiles.

36,869.—E. A. Stevens, of Hoboken, N. J., for Improvement in Constructing and Arming Vessels of War:

I claim, first, In combination with the means substantially as described, of depressing and elevating a vessel for the purposes specified, inclined metallic armor, so applied as to be rendered more fully effective by such depression of the vessel.

Second, I claim inclined metallic armor, in combination with the air vessels or compartments, F or F', substantially in the manner and for the purpose hereinbefore described.

Third, I claim the constructing and arranging, substantially as herein described of air compartments, for the purpose of giving buoyancy and stability to a war vessel, in combination with the means substantially as described of depressing and elevating the vessel.

Fourth, I claim the additional structure, G, constructed substantially as described, placed outside the sides of the vessels, at or near the water line, for the purpose of protecting the vessel.

Fifth, I claim shotproof loading-houses on war vessels, so arranged and employed substantially as herein described, that cannon outside of them may be loaded from within them.

36,870.—Joel Stone, of Cleveland, Ohio, for Improved Windlass:

I claim the use of the two horizontal screws, G G, constructing and actuating the windlass, B, substantially as described, the windlass having at its extremities a succession of pulleys or grooves, C, as set forth.

36,871.—T. R. Timby, of Worcester, Mass., for Improvement in Portable Warming Apparatus:

I claim the combination of the inner and outer cylindrical cases, A C, and flange, b b', with the openings, e e, and partition, D, when arranged and operating in the manner substantially as described.

[The object of this invention is to obtain a light and portable warming apparatus for the use of persons traveling, for warming bed and for like purposes, and it consists in arranging one cylinder to be filled with hot water within another, in such a manner as to have a space between them, which when a mild and gentle heat is desired, is filled with air; and when a greater heat or a temperature of nearly 210° is desired, is filled with boiling water.]

36,872.—T. R. Timby, of Worcester, Mass., for Improvement in Mercurial Barometers:

I claim the tube, G, arranged in line with and below the tube, F, containing the column of mercury, and combined therewith by means of the interposed elastic bottom of the cistern, in such manner as to constitute an expansion chamber in which a portion of the said bottom is capable of expanding, substantially as and for the purpose herein specified.

And I also claim making the cistern with a cover of india-rubber, or other elastic material combined with the tube, F, and fitted with a tube, d, of glass or other hard material, substantially as and for the purpose herein specified.

[This invention consists in a certain construction of the mercurial barometer, which provides for the shutting up of the mercury within the tube to render it portable, and permits the expansion of the mercury so shut up and guards against the breaking of the tube. It also consists in a certain construction of and mode of applying the cover of the cistern, whereby the danger of the tube being broken at its connection with the cistern is obviated.]

36,873.—W. H. Trissler, of Burr Oak, Mich., for Improved Stove Blacking or Polish:

I claim the combination of plumbago, or plumbago and German black-lead, with calcined plaster of Paris and alum, substantially in the manner and for the purposes herein set forth.

36,874.—Asahel Wheeler, of Newton, Mass., for Improved Copal Varnish:

I claim as a new or improved varnish, the composition of copal, alcohol and fusel oil, combined substantially in the proportions and manner as hereinbefore set forth.

36,875.—James Whitaker, of Philadelphia, Pa., for Improvement in the Take-up Motion for Power Looms:

I claim in combination with the ratchet wheel and pawls of a take-up motion for power looms, any convenient number of detachable pins, x, or their equivalents, acted upon by an additional pawl or its equivalent, substantially as set forth for the purpose specified.

36,876.—William Yapp, of Cleveland, Ohio, for Improved Mode of Sustaining Gutters to Buildings:

I claim the bracket bolt, B, and tube, A, the latter passing through the gutter and closed at its outer end; in combination with the within described fastening for attaching the gutter to the house by the bolt alone, substantially as specified.

[This invention consists in a simple device for attaching gutters to the cornice or walls of a building, whereby the gutter is more easily put up and with less expense, besides being more secure and defacing the building less than when attached in the usual manner.]

36,877.—T. B. De Forest (assignor to The Shelton and Osborn Skirt Company and L. and C. H. De Forest), of Birmingham, Conn., for Improvement in Apparatus for Attaching Clasps to Hooped Skirts:

I claim the employment of a hopper or shaking table, in combination with a guide plate, K, or its equivalent, for guiding the clasps on their backs to the feeder or conductor, substantially as hereinbefore described.

I also claim the employment of a feeder, I, or conductor, so constructed as to receive the clasps on their backs, and reverse their position as they pass down or through it, substantially as and for the purpose set forth.

I also claim the moving punch, D, in combination with the finger, d, or its equivalent and the feeder, the whole so arranged that the punch cut off one clasp at a time and forms a stop to the feed, substantially as hereinbefore explained.

I also claim the combination of the moving punch or set, D, and its clasp retaining device, d, with the work-supporting die, a, substantially as described, whereby the clasps are carried to the work and inserted and secured therein, as herein before set forth.

36,878.—J. H. Butterworth (assignor to himself and Henry McFarlan), of Dover, N. J., for Improvement in Machines for Making Brace Jaws for Steam Boilers:

I claim, first, The combination of the two plungers, D and E, and their respective rollers, a a and f f, arranged and operating as described, to bring the bar from the condition shown in figure 6, to that shown in figures 8 and 9.

Second, The combination of the dies, G G H and I, and the mandrels, m and n, the whole arranged and operating substantially as and for the purpose herein specified.

Third, Constructing the mandrel, n, in a forked form to allow the passage of the mandrel, m, through it substantially as herein described.

Fourth, The combination of the plungers, D E, rollers, a a f f, dies, G G H I, and mandrels, m n, the whole arranged to operate substantially as herein specified.

[This machine is composed of bending mechanism, pressing and forming dies and mandrels, so combined and arranged as to take a straight bar of square iron, double it, then by a second doubling, bring it to a form from which, by the action of pressing dies and mandrels, it is brought to the form of the jaw.]

36,879.—J. N. Bird, of Trenton, N. J., assignor to H. H Day, of New York City, for Improvement in India-rubber Wads for Projectiles:

I claim a vulcanized india-rubber wad for ordnance and small arms, applied and operating substantially in the manner and for the purpose described.

36,880.—James Dillon (assignor to himself and J. B. Nichols), of Lynn, Mass., for Improved Channeling Tool for Soles:

I claim the channeling tool as made with the tubular and angular cutters, B C, arranged substantially in manner and so as to operate as specified.

36,881.—P. W. Gates (assignor to himself, Thomas Chalmers and D. R. Fraser), of Chicago, Ill., for Improvement in Evaporating Pans for Saccharine Liquids:

I claim the steam coil evaporator with the defecating apartment, C, substantially in the manner and for the purpose described.

36,882.—T. D. Lakin, of Hancock, N. H., assignor to himself and Charles Wilder, of Peterborough, N. H., for Improvement in Ox Yokes:

I claim, first, The arrangement of the hollow thimbles, C, made to receive the bows, and provided with flanged heads, c, in combination with the slides, B B', and slotted bar, A, substantially as and for the purpose specified.

Second, The stirrups, E F, arranged at right angles to each other, and applied in combination with the semi-circular seat, h, staple, G, and recesses, j, as and for the purposes set forth.

[This invention consists in the arrangement of an endless belt, which is stretched on pulleys rotating on suitable pins in the middle of the yoke, in combination with slides connecting with said endless belt on opposite sides by means of suitable rods, in such a manner that the heads of the animals fastened to the yoke are free to move in a lateral direction, without, however, permitting them to come in such a position that one animal has the advantage over the other in regard to the leverage.]

36,883.—J. F. Townsend, of Westfield, N. Y., assignor to himself and P. P. Pratt, of Buffalo, N. Y., for Improvement in Butt Hinges:

I claim, as a new article of manufacture, a hinge composed of the two parts, A and B, arranged and operating substantially as specified.

REISSUES.

1,351.—H. S. Bartholomew, of Bristol, Conn., for Improved Ball Brace. Patented May 21, 1861:

I claim, first, A breast brace, A, the main portion of which is made from a rod of metal, substantially as set forth and for the purpose described.

Second, A breast brace, A, the main portion of which is made from a rod of metal, substantially as described, in combination with a bit holder made separate from the rod and suitably attached to it, substantially as and for the purpose set forth.

Third, A breast brace, A, with its ball made in one piece and secured upon it so as to maintain its proper position and to revolve, substantially as set forth.

1,352.—D. H. Dotterer, of Chicago, Ill. (formerly of Memphis, Tenn.), for Improvement in Journal Boxes. Patented May 7, 1861:

I claim, first, Providing in journal boxes an endless revolving band or ring, M, substantially as and for the purposes decribed.

Second, I claim the sheave, J, and axial pin, j, for supporting the upward thrust on the endless revolving band or ring, M, within the journal box, substantially as described.

Third, I claim the auxiliary end bearing, I, for the axle journal, substantially as described.

1,353.—J. C. Lefferts, of New York City, assignee of J. F. Martin and H. C. Nicholson, of Mount Washington, Ohio, for Improvement in Preserve Cans. Patented Feb. 15, 1859:

I claim, first, A fruit or provision can, to be hermetically sealed or tightly closed, constructed of metal, lined on the inside with a vitreous body to resist the action of acids contained in the substances to be preserved.

Second, A vitreously enameled iron provision can or jar, substantially as herein set forth.

Third, The combination of a vitreously lined metallic cover with a preserve jar, substantially as set forth.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention is susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Foreign Patents.

ry extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

A. B., of Conn.—Your plan of a Broadway railroad is not new. If you will turn to the back files of the SCIENTIFIC AMERICAN you will find the same thing illustrated. Such a plan will never be carried out; it would destroy the street.

D. E. R., of Mich. & J. H. D., of Mass.—We do not now remember the address of the parties to whom you wish to communicate. We often answer inquiries through our columns to correspondents whose letters being of no further importance, are not preserved. You could doubtless, reach the parties by inserting a short advertisement in our columns.

F. A. St. P., of N. Y.—If you are convinced that your invention is capable of being successfully applied to destroy the rebel iron-clads, you should explain it to those who are in authority and who can assist you to apply it, before making it public. We have had a great number of plans proposed to us for destroying enemy's ships, some of which were plausible, others quite impracticable.

A. S., of Conn.—The sulphate of lime is employed to keep cider sweet. One quarter of an ounce of it is used for each gallon of cider. You will find the method of applying it described on page 260, Vol. V. (new series) SCIENTIFIC AMERICAN, and the reaction which occur in its use are explained on page 281, same volume.

W. W. D., of Mass.—There is much room for speculation respecting the forces of nature and the cause of light, but such speculations, apart from experiments and long-continued observations, are very unsatisfactory. It is believed that the sun has a luminous atmosphere, and that it is an incandescent body. Its luminous atmosphere is due to its incandescence, just as the flame of a candle is the result of burning.

H. W., of Canada.—Wood when subjected to a high heat in a vacuum becomes charred, because it contains oxygen and hydrogen as well as carbon.

A. D. S., of Pa.—Experiments have been made with falling bodies, with reference to proving the axial motion of the earth. A bullet dropped from the top of St. Paul's in London has struck one inch east of the point described by a plumb line. It occupied 4½ seconds in its descent. This is due to the axial motion of the earth.

H. M. J., of Ohio.—Pencil marks on paper are simply portions of the black lead left by abrasion in writing, and india-rubber removes these by mechanical action. You will find the cause of the falling of the mercury in a barometer before a storm described in any good book on natural philosophy.

H. E. C., of New Orleans.—The cheapest and best material for street side-walks known to us, is good Kingston stone flagging. We have seen composition pavements laid down in this city, all of which proved failures. Tin is the next best roofing material to slate. As you desire a fire and water-proof roofing material, suitable for your climate, of course we cannot recommend an inflammable composition made of asphalt and tar.

R. C., of C. W.—You say you sent us a slip in March last cut from a British paper in reference to the cost of the Russian war and desire us to return it, that you may paste it into your scrap-book. We should be most happy to comply with your request, but we have no such paper in our possession. You will readily see that we cannot take to preserve and return such contributions.

E. L., of N. J.—It is scarcely possible to become a good chemist at the present day, without going through a regular course of instruction, combined with study and personal experimenting. "Well's Chemistry" and "Miller's Elements of Chemistry" are good works for you to study.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, November 5, to Wednesday, November 12, 1862:—

J. M. R., of N. J., $20; E. B., of Cuba, $30; J. L. B., of R. I., $20, J. L. B., of Mass., $20; A. C., of N. Y., $45; N. A. B., of N. Y., $45; E. V. L., of N. Y., $20; D. M. J., of N. Y., $20; W. J., of Minn., $45; N. F. S., of Ill., $20; P. D., of Minn., $20; J. M. M., of Conn., $45; C. E. S., of Wis., $30; C. & McI., of Mass., $20; H. K., of N. Y., $20; D. D. P., of N. Y., $70; G. C., of Mich., $20; U. D. & B., of Conn., $20; F. W. H., of Mass., $20; D. K., of Pa., $15; J. E. S., of Maine, $25; J. E. Van W., of N. J., $15; I. C., of Ill., $25; I. G., of R. I., $130; G. H. F., of N. Y., $15; E. B., of Ill., $22; B. R., of Mass., $250; T. C. F., of N. Y., $25; H. M., of Wis., $15; A. L., of N. Y., $35; R. H. W., of N. Y., $25, G. C., of N. Y., $12; M. L. G., of Wis., $25; H. P., of Maine, $22; J. D., of Ky., $15; P. H., of N. Y., $25; A. C. C., of Mass., $15; L. D. B., of N. J., $22; W. P., of N. Y., $15; G. E., of Ohio, $25; C. R., of Mich., $15; J. U. M., of Mich., $15; C. P., of Ill., $20; S. F., of N. Y., $15; Van W. and McF., of N. Y., $175; J. W. B., of Mich., $45; G. C., of N. Y., $15; W. B. G., of N. Y., $20; N. & D., of N. Y., $20; S. L., Jr., of N. Y., $25; M. H. F., of N. Y., $25; G. G. of N. J., $25; H. S. B., of La., $30; C. H. M., of N. Y., $35; G. G. G. of N. Y., $12.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from November 5, to Wednesday, November 12, 1862:—

G. G. G., of N. Y.; C. H. M., of N. Y.; J. R. A., of Pa.; I. C., Jr. of Ill.; J. E. S., of Maine; P. S., of N. Y.; G. C., of N. Y.; H. S. B., of La. (2 cases); M. L. G., of Wis.; G. G., of N. J.; A. L., of N. Y.; R. H. W., of N. Y.; J. A. De B., of N. Y.; M. H. F., of N. Y.; N. & D., of N. Y.; S. L., Jr., of N. Y.; D. D. P., of N. Y.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $3. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

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VOLUMES I., II., III., IV., V., VI. (NEW SERIES) COMplete (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Numbers 3, 4, 6, 8, 9, 10, 11, 12 and 16, of Vol. VI. are out of print and cannot be supplied.

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

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nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

Preis 20 Cts., per Dtzd 25 Cts.

On Shoeing Horses.

The following are some extracts from a letter in the *Prairie Farmer* by G. H. Dadd, veterinary surgeon. He says :—

One of the principal objects in applying a shoe is to protect the foot; next, we must aim to preserve the natural action and tread of the foot. With this object in view the shoe should be made concave on the ground surface. An unshod horse, or one in an aboriginal condition, has a concave sole surface to the foot, and wisely is it so ordained ; were it otherwise, the animal would be unable to obtain secure foothold when climbing eminences or traveling over level surfaces.

The action of concave feet may be compared to that of the claws of a cat or the nails on the fingers and toes of man ; the nails and toes are the fulcrums ; they grasp, as it were, the bodies with which they come in contact, and thus they secure a fulcrum of resistance when traveling or grasping. Now in order to preserve the natural, mechanical actions of the horn and sole, the ground surface of the shoe must correspond exactly with the ground surface of the foot ; that is to say, the ground surface of the shoe must be beveled, cup fashion, its outer edge being prominent, corresponds to the lower and outer rim of the hoof ; while the shoe being hollow, it resembles the natural concavity of the sole of the foot.

No matter what may be the form of the foot, whether it be high or low heeled, contracted at the heels, lengthened or shortened at the toe, or having a concave or convex sole, it matters not, the ground surface of the shoe must be concave. In every other part of the shoe alterations and deviations from any given rule or form are often needed in consequence of the ever-varying form of the foot, and the condition of the same both as regards health and disease ; but the sole of the foot being concave presents a pattern for the ground surface of the shoe, which the smith with all his skill cannot improve on, and if all such craftsmen were to follow this pattern more closely than they do, there would be fewer accidents in falling and a less number of lame horses.

BROWN'S PATENT AUTOMATIC LETTER-BOX.

The postal necessities of large cities involve the provision of proper facilities for mailing and collecting the letters which it is desirable to dispatch without going to the General Office. This end has been, in a measure, attained by the street letter-boxes which are affixed to the lamp posts, or placed in stores. In the former there are many objections, some of which are that only letters can be deposited in them, that they are not absolutely safe, and that the openings are too narrow to admit anything but an ordinary letter. These faults have been met and overcome, we think, by Mr. J. W. Brown of this city, an engraving of whose invention we herewith present. It consists of an ornamental case—of any desired shape, having a slotted cylinder on top. Outwardly the case is perfectly plain in appearance, but by taking hold of the knob or button, and rotating the outer cylinder upon its axis, an opening is disclosed which is large enough to admit a package equal in bulk to two newspapers. In this opening the mail matter is placed, the hand being withdrawn, the cylinder rotates and the letters or papers are securely deposited in the body of the case, from whence no one can take them but those provided with the key. Fig. 1, shows the box, A, affixed to the lamp post ; the outer cylinder, B, is thrown back and the place of deposit disclosed. The parallel lines, *a*, at the top of the opening, represent the edges of the valves or shelves, a peculiarity of the box, and the projection, *b*, at the end of the cylinder, is the point of suspension. The knob, *c*, is the handle which moves the outer case, B. Fig. 2 represents the cylinder and its valves in section ; the valves, *a*, are suspended from their sides, and are arranged upon both sides of the opening or throat, in such a manner that they constitute a false passage. When the case is rotated they close together by means of the action of the pins in the slots, *b*, shown by the dotted lines, and also by their own gravity. When the mail matter is deposited in them, and the cylinder, B, released, the cylinder being heavier on one side, falls down, and the valves, *a*, are thrown close up against the walls, *d*, or natural opening of the cylinder. By this means the passage is made much wider than it was when the paper or letter was first deposited, and all possibility of its

Fig. 1

choking or wedging fast, is done away with. The parallel dotted lines show the position of the cylinder

Fig. 2.

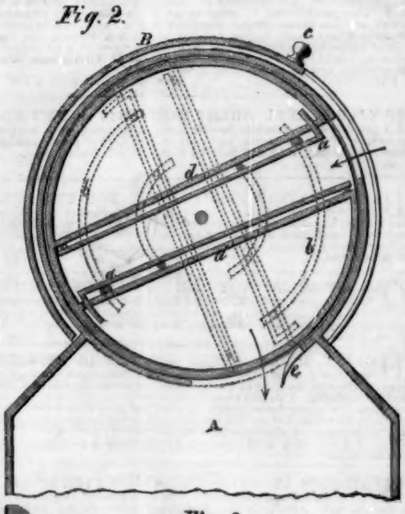

Fig. 3

and its valves when the letter is deposited, and the arrows indicate the opening and discharge. A serrated edge or saw *e*, is attached to the inside of the case, extending, just below the opening, for its whole length ; this is for the purpose of catching any strings or other devices which evil-disposed persons might employ to abstract the deposits.

The construction and arrangement of this letter-box is very ingenious and we think well adapted to its object. When not opened by the depositor, it is proof against wet, or dust, and presents outwardly a uniform and pleasing appearance.

The patent for this invention was procured through the Scientific American Patent Agency, April 15, 1862. Further information respecting it may be obtained by addressing Mr. J. W. Brown at 666 Ninth avenue, New York city.

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